

Cardozo Arts and Entertainment Law Journal
2017

Article
Amir H. Khoury¹

Copyright © 2017 by Yeshiva University; Amir H. Khoury

INTELLECTUAL PROPERTY RIGHTS FOR “HUBOTS”: ON THE LEGAL IMPLICATIONS OF HUMAN-LIKE ROBOTS AS INNOVATORS AND CREATORS^{d1}

Introduction: The Catalyst of the Research and its Underlying Hypothesis	636
I. On Intelligent Machines	637
A. <i>Autonomous Robots and the Emergence of Hubots</i>	640
II. The Three Layers of the Hubot-IPR Question	642
A. <i>On the Concept of Legal Rights and Obligations for Hubots</i>	642
B. <i>Who Should Own Intellectual Property Subject Matter that is Generated by Hubots?</i>	647
C. <i>How the Law Needs to Treat the IP Subject Matter that is the Product of a Hubot?</i>	654
III. Why Robots Cannot be Considered to be Equal to Humans?	665
Conclusion	668

Abstract

*The research in this Article provides the answer to the following question: how should the law deal with innovations and “creative” works that are independently “created” or generated by robots? Specifically, this Article focuses on the legal implications of innovation and content generated by robots with artificial intelligence, which will be referred to in this Article as “Human-Like Robots” (hereinafter “Hubots”). The position which this Article advocates for is that *636 intellectual property subject matter created by Hubots are equivalent to things found in nature and should not, and cannot, qualify for the same IP protections that are awarded to human creators and innovators. This position stems from the more general approach whereby Hubots should not be provided with “human” rights including property. Thus, intellectual property laws must not allow for granting IP rights to Hubots, and their byproducts should forever rest in the public domain.*

Introduction: The Catalyst of the Research and its Underlying Hypothesis

If this Article had been written fifteen years ago, it would have probably been rejected as “too far out”--that is to say that it would have been more in the realm of “legal fantasy.” Oddly enough, if this same Article would be written fifteen years from today, it would be rejected as “too obvious” or “too late in the game.” In robotics, we are truly at an intermediate era between what *was* and what *is to come*. This is exactly why the entire concept of complete Artificial Intelligence (AI) seems, to many, too far-fetched. In the very near future, it is set to become an integral and possibly dominant part of the way we live. Some go as far as entertaining the possibility of an “Apocalyptic AI” where human existence, as we know it, ceases to exist and merges with robotic lifeforms.² While the implications of AI 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-à-vis robots with AI, and referred to throughout this Article, as Human-Like Robots (“Hubots”).

My 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 non-human 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 *637 such, should not, and cannot, qualify for the same IP protections that are awarded to human creators and innovators.

I. On Intelligent Machines

“To some, the prospect of the complete integration of AI robotics in our world seems far-fetched.” However, those involved in the development of robotics would agree without reservation that humanity is at the doorstep of a world full of AI robots.³ Given the rapid development of robotics and computers as well as nanotechnology and bioinformatics, AI robots are set to become an integral and possibly dominant part of the way we live, interact, communicate, travel, and do business.⁴ Given that these types of activities involving humans are regulated by laws, those same laws will have to adapt to the new reality of AI. According to Raquel Acosta, many of the things that we associate AI with such as understanding language, as well as nuanced language, solving novel problems, and learning through experience, are “just starting to be real phenomena.”⁵ She posits that “[w]hile self-aware robots remain within the realm of fiction, developments in the field of artificial intelligence are advancing our understanding of what computers are and what they are capable of being.”⁶ It is worth noting that, to date, at least one experiment has demonstrated possible proof of self-awareness in robots.⁷

Artificially intelligent machines are not new to our collective awareness—we seem to accept them whole-heartedly as part of the future reality. Indeed, literature and the motion picture industry have familiarized us with the idea of human-like persona walking among us and interacting with us.⁸ More importantly, even today, the advent of *638 robotics cannot be ignored. Robots are playing a growing part of everyday life—from autonomous vacuum cleaners to autonomous cars, hospital robotic nurses, and robots in factories, in the workplace, at home, and obviously as Internet search engines.⁹ This has prompted thinkers and futurists to ponder the legal implications of these rapid developments and their future amongst us.¹⁰ The idea of robots acting as rational agents in roles that are contingent on human traits, such as reason, has already been entertained with respect to mediation and dispute resolution,¹¹ and as financial market traders,¹² as well as on the battlefield.¹³ There are already a few areas where the deployment of intelligent robots has become reality, including data mining, automated bots, self-managing systems, as well as computer aided design (“CAD”) or video games.¹⁴

The idea of robots communicating with humans in a human-like manner is not new. In fact, as early as the 1950s, Alan Turing proposed a test, which became known as the “Turing test,”¹⁵ where one could assess a robot or machine's ability to appear human to a human who comes in contact with it.¹⁶ The question is whether the machine could generate responses in a conversation with the human, creating the illusion of what will be referred to as Human to Human (“H2H”) interaction. Over the past few decades, these machines and their functions have developed impressively using natural language processing (“NLP”) as well as through incorporating machine learning *639 (“ML”) techniques, the most robust of which is IBM's Watson.¹⁷ Despite these amazing undertakings, all of these machines are deemed to be “weak AI,” because they are geared towards imitating humans and dredging information from the vast sea of electronic data at their disposal. But over the past few years, a paradigm shift has taken shape in the way that humans create intelligent robots. The move has been towards “algorithms inspired by genetics and network structures based on neurological connections.”¹⁸ Indeed the shift is towards “artificial neural networks” that are “inspired by the inner workings of the brain and are often adaptive systems that change structure in response to information forms.”¹⁹ In this context, James Albus provides a clear and comprehensive definition of intelligence, which may also apply to artificial intelligence.²⁰ 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 behavioral sub goals that support the system's ultimate goal.”²¹

It is worth noting that the progression in the ability of machines to think intelligently stretches a few decades back. In fact, as early as 1994, computer scientist, Stephen Thaler, built a “Creativity Machine” that autonomously produced patentable inventions and composed music.²² His machine was created using two interconnected neural networks.²³ Madeleine de Cock Buning refers to a number of such robots already in existence today that are capable of producing creative *640 outputs including music, “such as David Cope’s music composer ‘Emily,’ ‘Paul’ the artificial painting tool, and StatSheet’s automatic sports journalist.”²⁴

Having established the existence of this progression towards full AI robots, the question at the heart of this Article becomes, how then should the law regulate the artistic, literary, or scientific byproducts of autonomous intelligent robots? Answering this question requires an examination and understanding of the interface between AI robots and intellectual property. This question should encompass how the law should deal with innovations and creative works that are *independently* created by robots. Specifically, it should focus on the legal implications of generating innovation and content by robots with artificial intelligence and which also possess a human-like appearance, like Hubots.

A. Autonomous Robots and the Emergence of Hubots

A system is described as autonomous when it can independently perform an assigned task without human guidance.²⁵ Broadly speaking, machines must meet three cumulative conditions to qualify as possessing autonomous intelligence: (1) the ability to compute information; (2) the ability to learn; and (3) the ability to reason.²⁶ These conditions would collectively make the machine more like a human than a machine.²⁷ Add to these a human form and you now have a Hubot. This is not a theoretical outcome--various companies are now engaged in the research and development of Humanoid robots.²⁸ While *641 a variety of other names such as Autonomous Intelligent Systems²⁹ and Wisdom Machines³⁰ have been used, I have coined the word Hubot for these human like robots in order to accentuate the challenging question presented here. I propose to deal with robot rights over IP byproducts in the context of robots that look and act human. Thus, the use of a term such as Hubot is intended to challenge us to deal with the subject of IP rights in the context of machines that look like us and are created in our image. In such a case, understandably, the legalistic “heart” (and our human inclination) would find it more difficult to deprive human lookalikes the same rights that we, as humans, inherently have. Kate Darling makes note of the human tendency to project emotions onto objects. She observes that “[p]eople tend to anthropomorphize robots that interact with humans on a social level.”³¹ But while the legal heart might be confused, the objective here is to show why the legal mind should not falter when it comes to this determination regarding the legal standing of Hubots. As previously alluded to, all this may mature into reality over the next fifteen years or so, and hence, its value transcends the theoretical realm.³² It is important to note that the issue being raised here regarding the legal standing of robots and the challenge it presents³³ has been on the minds of many scientists and thinkers dealing with this phenomenon of artificial intelligence.³⁴

***642 II. The Three Layers of the Hubot-IPR Question**

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 AI robotics. I also compare rights and liabilities and show why they are symmetric when it comes to the regulation of robotic entities. Second, I focus 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. I will look into the prevailing conventional theories that underlie intellectual property protection namely the Incentive or Utilitarian Theory, and the Labor Theory. Furthermore, I examine 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 I put 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.

A. On the Concept of Legal Rights and Obligations for Hubots

As I have alluded to thus far, every day, humanity is moving closer towards creating robots in its image. Technology is moving rapidly towards the creation of robots that have the ability to interact with humans and to respond to their needs. As robots will increasingly come in contact with many facets of our lives, the need increases to comprehensively think about the legal ramification of this. In this new world, robots will no longer only be involved in precision intensive industries or in mass-production but will be able to rationalize (for lack of a better term) or to calculate the optimal course of action to be undertaken in order to research an outcome that is good. The assumption here is that robots will have human-like traits, such as the ability to distinguish between right and wrong and the ability to resolve challenges in a creative manner given a set of circumstances that the *643 robot encounters. Mario Tremblay observes that “Robotic technology, as well as artificial intelligence, is advancing rapidly, and robots are increasingly playing a larger role in society As this is happening, the question of who is responsible for their actions is becoming an ever more prominent and important discussion to have.”³⁵ Here, in this robotic new world, the first follow-up question that comes to mind is who, if at all, will be held liable for the actions of these machines? Indeed, who would bear both the legal and moral responsibility for potentially harmful actions by robots, such as assaulting people, destroying property, or being involved in accidents? This is a valid question that has crucial regulative and legalistic implications. This question goes leads us to examine the nature of these robots and how we perceive them--it involves questions of agency, free will and the definition of human life itself.³⁶

From the outset, I should note that the regulative challenges with respect to robots are not limited to the issue of liability. The idea of legislative regulation of robots has been around for some time. For example, in the U.S., there have been cases that have dealt with issues involving robotic themes and concepts.³⁷ There remains much to be done in legal thinking, with respect to understanding this field which, to date, remains relatively uncharted. According to Ryan Calo, “jurists on the whole possess poor, increasingly outdated views about robots and hence will not be well positioned to address the novel challenges they continue to pose.”³⁸ As early as the 1980s, some have entertained the notion that robots “can have legal rights.”³⁹ The legal challenges that loom with respect to the new era of robotics is eloquently summed up by Neil Richards and William Smart wherein they state that

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 *644 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.⁴⁰

In fact, this question of rights for robots is no longer theoretical--there is already an ongoing debate and even proposals to legislation dealing with rights for robots.⁴¹ In this context, Japan stands out in the headway that it has made in this regard.⁴² My present research fits into this legal genre but does so in a more focused manner--that of intellectual property rights. As I alluded to in the introduction, my aim here is to address the human-robot interaction in the context of IP-type subject matter. The question is about exploring the question regarding the status of content and innovation that are caused, not created,⁴³ by Robots, or more specifically Hubots. This issue goes to the heart of who, or what, can qualify for legal rights and on the flip side who bears liability.

Before I address the issue of robot rights including those of IP, it is important, and in fact more logical, to address the potential liability of autonomous robots or Hubots. In the near future, such Hubots could “decide” to undertake a certain response if they so deem fit or to engage in certain actions if given a set of circumstances before them.⁴⁴ This remains a far cry from today's robots which, although externally seem to engage in action that appears to be emotionally based, are in reality *645 driven solely by ingenious programming that mimics human traits and reactions. With respect to future Hubots, there arises the quandary of liability. Tremblay comments that “[a]lthough robots are not able to make personal choices yet, there should still be a careful consideration of who is at fault when an autonomous or semi-autonomous being harms someone or causes damage.”⁴⁵ It is important to note that the issue of harmful actions that robots can engage in is not limited to the physical or real world--they also, as may be expected, have a far-reaching impact on the cyber or virtual world.⁴⁶ Indeed, the issue of “digital trespass” is already acknowledged as a relevant topic in today's robotic world, and technical methods to combat it are already being considered.⁴⁷ Issues surrounding the fault and liability of robots have already been dealt with by a few commentators and researchers.⁴⁸ In the context of robotic misconduct, Isaac Asimov's three laws of robotics provide an interesting model wherein human well-being is its core.⁴⁹ But these rules are limited in their scope and are focused primarily on the physical well-being of humans. The rules do not seem to encompass other ethical and social challenges that may arise in a new world with robots, such as social norms and intellectual property preservation. Even more so, these laws envision a world where humans and robots might clash, but do not seem to apply in a world where robots exist among us, and are intertwined into the fabric of our lives.⁵⁰

In this context, Hallevy contends that “[u]sing the current definitions of criminal liability, the imposition of criminal liability upon AI entities for committing IP offenses is quite feasible.”⁵¹ In the civil *646 realm, there are a variety of possible models of liability that can be applied when dealing with robots. Many of these models mimic existing legal doctrines. First, it is possible to claim that a robot is merely a product or a machine that is manufactured. As such, it may be possible to hinge liability for any damage caused by a robot on its manufacturer.⁵² This could be done through a product liability construct or more broadly, within laws of consumer protection.⁵³ The problem with such a construct is that Hubots are typically machines that are programmed to function in a certain way. In fact, the Hubot would have discretion and a will of its own. As such, in the context where robots are manufactured by humans and not by other robots, Hubots cannot be deemed to have the ability to anticipate the actions of this autonomous thinking robot. Thus, Hubot-type robots cannot be categorized as a commercial product. Robots, and at the very least, Hubots, cannot be regulated in that technical manner and therefore, the harm that they may inflict on persons and property cannot automatically be attributed to the human that created it in the first place. Therefore, these conventional approaches within the law are not sufficient. As a result, Hubots should be dealt with as a new category. In fact, much thought has already been devoted to the need for developing a concept of “machine ethics.”⁵⁴ Peter Asaro entertains the idea that “[a]s robots begin to approach more sophisticated human-like performances, it seems likely that they might be treated as quasi-agents or quasi-persons by the law, enjoying only partial rights and duties.”⁵⁵ But this is also not the correct approach when it comes to Hubots because, if their conduct is fully autonomous, as is assumed, and if their decision to act in a harmful way is not part of their profile, then they need to be treated as completely separate from their manufacturers. In this regard, I should like to add that a corporate responsibility model is not suitable here either because these entities are legal constructs, but the action is undertaken by people acting on policy *647 and decisions that they undertook in the name of the corporation.⁵⁶ Conversely, in the case of robots that are classified as Hubots, they are distinctly separate from their manufacturers. Thus in my view, the electronic umbilical cord has been severed.

Hubots are separate entities--they are not alive and as a result, they cannot bear legal responsibility for their actions. If a Hubots goes rogue, then like any natural phenomenon, it needs to be dealt with and either fixed (by way of fixing the glitch) or terminated.

B. Who Should Own Intellectual Property Subject Matter that is Generated by Hubots?

Having discussed the idea of rights and obligations of robots, I now focus my attention on the main topic of this research--who should be the legal owner of intellectual property (IP) generated by Hubots?

Miller and Acosta both voice the opinion that when it comes to determining the identity of the IP rights holder,

[t]he crucial question appears to be whether the “work” is basically one of human authorship, with the computer merely being an assisting instrument, or whether the traditional elements of authorship in the work (literary, artistic or musical expression or elements of selection, arrangement, etc.) were actually conceived and executed not by a man but by a machine.⁵⁷

My view is that Hubots cannot and should not qualify for IPRs no matter the degree of their independent intelligence. The resulting question is then, why are Hubots not entitled to own the IP that they “create?” In order to provide an answer to this question, it is important to first examine how IP rights are awarded.

In essence, there are two underlying conditions for IP protection. The first is that the law recognizes the given subject matter as IP.⁵⁸ The other essential requirement to recognize IPRs is that there exists an IP-right holder.⁵⁹ With respect to the first condition, this means that there exists a law or a legal corpus, or in common law, a ruling that *648 recognizes the subject matter for which protection is being sought.⁶⁰ This, broad definition includes all types of IP known to us today, including utility patents; trademarks; service marks; original works of authorship (under copyright); design patents; integrated-circuits; and designations of origin and trade secrets.⁶¹ With respect to the latter condition, there is a need to identify an IP-right holder. Said holder is typically the creator and/or the owner of the IP subject matter. Absent such an entity, there is no persona on which to hinge the relevant IP rights.

Hubots cannot qualify for such a legal status and as a result, cannot be said to hold IP rights. Despite their human-like traits, Hubots are merely the generators of things, just as nature functions at its own accord (and seemingly in random). In a similar context, Tremblay observes, “although the actions of today’s most advanced robots may appear to be emotionally based, current technology allows just preprogrammed responses from the robot’s software design.”⁶² But, beyond that, even if a certain Hubot is deemed to have full awareness and a “life” of its own, it still remains a machine--its seeming humanity is only a reflection of our own humanity and human emotions. In a more dramatic statement, I would add that Hubots cannot own IP rights, even if they are fully independent machines--this is in order to protect the IP field from ultimate demise. Thus, any and all Robots, including Hubots, cannot and should not own property in the way in which the law awards human creators or corporate legal entities that they establish. In my view, awarding IP rights to Hubots would basically defy the underlying rationales of IP, especially in the context of the two leading western-based rationales--namely the Labor/Desert Theory and the Utilitarian/Incentive Theory⁶³ which I expand later in this Article.

Having stated that Hubots cannot and should not benefit from legal protection over what they “create,” there still remains the question of who, then, should own that creation. Consider, for example, a computer programmer who writes a symphony that is performed on stage by Hubots. In this case, it is legally valid to contend that although the computer programmer did not in fact play a single note, the music that he created using the Hubots is under his ownership. A second example *649 would be one in which the same Hubots are performing music that was independently created and generated by them. Here, no IP rights should be awarded to the programmer.

There is no discrepancy between the two above-mentioned responses to the two cases because in the latter case, the Hubots have created a work of art without any direct intervention by or from a human. As such, the content that is generated by random data and not by a pre-planned design (i.e a random product) cannot qualify for legal protection and the Hubot or its human owner cannot own the IP rights over the said product. However, if the robots, or Hubots, have been preprogrammed to generate the

music in a certain fashion, then the resulting product can be attributed to the human owner or creator of the product. Tremblay uses the term “software agency” which is quite fitting with this discussion.⁶⁴ A human may be held liable for the actions of a robot that he owns--such as autonomous cars--“as their actions can be traced back to ‘programmer commands.’”⁶⁵ In his view, “[t]he progression from a robot acting as a ‘software agent’ to an ‘intelligent agent’; when it acts on algorithms via inputted information rather than direct instructions, is the foundation of artificial intelligence (A.I.).”⁶⁶ In the context of the aforementioned examples, I would add that if the accident or the music can be logically anticipated from the type of actions that the robot or Hubot was programmed to carryout, then liability or rights could arise through “software agency.” Thus, in both cases of liability or ownership over IP subject matter, a legal construct of “software agency” can, and should, apply. Where the person controlling the robot can reasonably expect the robot to create a certain product or to malfunction in a certain way, then all actions in that range revert back to the person through said agency construct. If, however, the robot's actions are outside that range of expectation, just as one cannot predict the random music that is created by wind chimes, then the “software agency” theory cannot apply. If a Hubot goes rogue or goes Mozart, in both cases that would most likely be outside the realm of “software agency.”

A secondary question then arises--should there be a distinction between the robot's creator and its legal owner? Tremblay seems to call for such a distinction wherein he states that, “[j]ust as the owner of a dog is ultimately responsible for its actions, rather than the dog's breeder, so may the owner of the robot bear the responsibility of their robot's actions, and not the software engineer. However, because the engineer won't be culpable, neither will they be in ownership of what *650 the robot creates.”⁶⁷ However, in the context of IP, no human could or should claim ownership over the IP subject matter that is created or generated by Hubots. The human creator of the Hubot is neither liable for nor able to benefit from the IP that is created by the Hubot given the absence of “agency.” Also, the owner of the Hubot cannot claim ownership because he has made no “value added” contribution to the creation of the IP generated by the Hubot.⁶⁸

Here, I would like to emphasize the difference between robot rights and liability in the context of IP. While the Hubot, as a creator, has no rights in the works it produces, it is possible to envision cases in which humans use robots in order to create works or to infringe upon works.⁶⁹ In those cases, the robot would be acting as an agent for the human. Therefore, the person operating or programming the robot to operate in a certain way, is liable for the harm that it causes. With that said, it is important that rights and obligations are not confused; while in the former case, Hubots are acting independently, in the latter cases, they are ultimately tools in the hands of their human operator. In this regard, I agree with the view that is expressed by Grimmelmann, regarding the possibility of assigning liability to cases involving robotic readership.⁷⁰ In such cases, a human copyright-holder has a right to combat this electronic trespass without regard for the identity of the trespasser. If it is a human trespasser, whether directly or indirectly--as an operator--then liability can be attributed to the human. If a Hubot is operating independently of any human intervention, then no liability can be found--but the author's rights to prevent the continuation of the infringement still holds.

Another point that relates to the nature of creativity in AI robots is highlighted by Acosta who observes two approaches to such creativity. In her view, “[e]arly research into AI encountered difficulties that arose partly due to the implicit notion that to be ‘artificially intelligent’ a program must process information such that the result parallels how an intelligent person would respond in response to similar input.”⁷¹ Acosta *651 then submits that “artificial intelligence researchers have different perspectives on what it means for a machine to be ‘creative.’”⁷² And I agree with this observation. However, for the purposes of this current discussion, this distinction, or rather the lack of agreement between researchers as to what constitutes creativity is of no consequence here. This discussion assumes the existence of a Hubot byproduct that mimics works of art, music, and literature as well as innovations--the focus is on the end product, not the process that takes place inside the Hubot. For the sake of fairness, no IP law gives much attention to the human genius that brings about works of music, art, literature or innovations.⁷³ The law, in fact, does not concern itself with the mental process that takes place inside the mind of the creator, but rather examines the product on its own merits and determines if it qualifies for protection.⁷⁴ After all, when Hubots end up authoring novels, composing music, or making an invention it is we, the humans, who will consume that product and adopt it into our own culture

and life if we so choose. Therefore, I shall refrain from considering the “mental” process that takes place in the Hubot’s circuits and computer, and deal with the legal status of the IP products that they generate.⁷⁵

When it comes to artificial intelligence that is beyond the control of its “master,” the “software agency” umbilical cord is severed, giving the Hubots a “life” of their own. According to Clifford, “no one derives rules for the computer to control its creativity; rather, using its learning algorithm and based on the training examples it is given, it develops rules on its own”.⁷⁶ With that said, while the Hubot is left beyond the limits of the agency, it remains below the threshold of a legal entity that can benefit from rights, including IP rights. It is, so to speak, forever banished to a legal “no-man’s land.”

As already alluded to, Hubots cannot, and should not, qualify for ownership over IP subject matter which they have generated.⁷⁷ In order to explain why this is so, it is important to shed light on the rationale of granting IP rights, and to determine whether Hubots as IP owners can contribute to the advancement of said rationale. It is important to note that not all share this view--in fact, some argue that the resolution of IP *652 rights for Hubots is contingent on the extent of intelligence that said entities will have. Acosta explains that “[w]ith our current technology, only humans can make genuinely creative choices.”⁷⁸ However, she then states that innovations in AI technology that “possess a high enough degree of autonomous computational creativity” could “require re-examination of copyright standards.”⁷⁹ I do not hold this view--my approach is about drawing a clear-cut line between human and non-human entities, even if they happen to be Hubots that are fully human-like.

Returning to the basics of the IP story, we begin with the rationales that underlie IP protection. Here, at least in Western legal thinking, one would typically find two leading theories: the first relates to the labor and effort that is exerted by the creator-innovator, and the second theory hinges on the incentive that such protection would ensure.⁸⁰

The first theory, that is also referred to as the labor theory or the desert theory, originates from Lockean thinking.⁸¹ Indeed, the idea of property that is granted due to the sweat of the brow, is based on moral justifications; it is about respect for the creator of the work or the innovator, and how goods are allocated amongst members of society.⁸² This theory forms the backbone of continental IP law.⁸³ The other theory is the Utilitarian theory, which is based on the idea of incentives.⁸⁴ The idea here is that property in IP is granted to the creator of the work, or to the innovators in order to ensure an incentive to said person, or others like him, to engage in further creativity and innovation.⁸⁵ Additional theories exist, including the Hegelian theory, in which creativity and innovation subject matter constitutes part of its creator’s persona and honor.⁸⁶ Here the view is that just as the law protects a person’s good name, so too his creations need to be recognized and protected. This third theory is used to justify certain IP rights, especially moral rights, in copyright law.⁸⁷

The utilitarian theory constitutes the backbone of IP protection in *653 Anglo-American legal thought.⁸⁸ In fact the U.S. Constitution empowers Congress to “promote the progress of Science and the useful Arts.”⁸⁹ The limited monopoly, in both time and content that is granted to some IP subject matter such as copyright, patents and design patents, is intended to incentivize more creative work and innovation.⁹⁰ And it is at this point where any idea for awarding IP to robots collapses. Robots have no measure of intention to create works and they are not motivated by incentives through IP rights. Said machines would, at most, create what they know to be expressive of the human condition or to improve the utility of the world as they perceive it to be. But all of this would emanate from cold lifeless intentions--for lack of a better expression in this context. Hubots have no heart (and obviously no soul), and therefore, by definition, are not alive in the way that we live and exist in the world.⁹¹ While this view is purely physical and legalistic, I have in my reading ventured into other realms of discussion, including primarily the theological realm--however, these views remain outside the scope of discussion of this Article. With that said, I do think that the line that divides people from robots should be preserved at all costs, not only on the legalistic level, but also on the moral and substantive level as well. In this regard, I agree with Calo’s observation that “[r]obots blur the line between people and instrument, for instance, and faulty notions about robots lead jurists to questionable or contradictory results.”⁹² The

distinction between man and machine, no matter how developed it is, is imperative. It is the key to preserving our humanity, towards ourselves, but even more so towards each other. Thus, my view with respect to robot rights in the case of IP is not only indirectly supported by long-standing IP rationales, it also fits well into this broader theme of man and machine. A distinction between both must be upheld and maintained.

Another possible approach to dealing with copyrightable content that is a byproduct of a Hubot, could be through a more selective approach—that is to say not to grant protection per se but rather to *654 dissect the IP subject matter and determine which parts should qualify for such protection. Such an approach would basically, at least in the case of copyrightable subject matter, follow the logic of determining copyright protection, set out by the Second Circuit in *Computer Associates International, Inc. v. Altai, Inc.*⁹³ In that case, the court formulated the Abstraction-Filtration-Comparison test (“AFC test”) in order to determine which non-literal elements of software are protectable by copyright law.⁹⁴ As its name suggests, the AFC test applies three cumulative layers in order to reach a determination. The first layer, abstraction, separates protectable content from non-protectable content along the lines of the idea/expression distinction. The second layer (filtration), focuses on elements which although, in principal, can be protected, are functionally equivalent to granting copyright over an idea. The third layer, comparison, considers how much of the content is taken from the public domain.

There are many problems in applying such a selective approach of IP subject matter to the byproducts of Hubots. First, applying such a test assumes that Hubots can own IP or at the very least, that their human “masters” should benefit from the same. Both assumptions are very problematic and they negate, and even undermine, the very rationales that underlie IP protection—namely incentive and desert. Second, applying a test for every case would be extremely complex, costly and more importantly, would not provide for legal clarity and stability. This would bring about a more ad-hoc rule whereby the IP subject matter would not only be scrutinized as such but would be intrinsically linked to the identity and capabilities of the robot that developed it. Third, by applying such an approach, much of the science and advancement would needlessly be kept out of the public domain where it rightly and logically belongs.

C. How the Law Needs to Treat the IP Subject Matter that is the Product of a Hubot?

Following the discussion as to why Hubots cannot logically or legally qualify for legal rights in the IP products that they cause, the next question that must be addressed is this—what do we do with these products and how do we deal with them on the legal level?

Madeline de Cock Buning refers to reverting IP rights to the public domain.⁹⁵ She observes that that in AI cases where the IP subject matter is solely produced by the machine and as such, no originality is vested in the owner, no copyright should be granted to the machine because the “machine is not a legitimate right holder” and “[c]opyright cannot be *655 granted to non-human entities.”⁹⁶ In her view, given this state of affairs, “the only option is that no one can claim copyright protection, that is, autonomous creations should enter the public domain.”⁹⁷ I agree with this view. Indeed, my view is that the public domain option is the only option when it comes to the interface between AI robots and IP. The public domain is the path that should be followed because it serves to expand creativity, ensures incentives to human creators to create inventions, and improves the human condition.⁹⁸

The term public domain is not limited to intellectual property—it is much broader. According to Kristopher Erickson, the public domain is intended to “serve an essential purpose in democratic society by providing a common reservoir of information upon which an informed citizenry can make choices.”⁹⁹ The IP public domain is a subdivision of the general public domain wherein, according to Erickson, “[i]ntellectual property law is one mechanism by which societies regulate expressive spaces which can fulfill [sic] the role of a public domain.”¹⁰⁰

Imagine wanting to protect the music that the wind generates when it moves through wind chimes, the sounds of a waterfall, or birds proclaiming the advent of a rising sun. All these sounds cannot be attributed to a legally recognized persona and therefore remain within the public domain as a matter of course. The same applies with regards to Hubots. In this regard, my approach is not completely detached from the approach of law. In fact, in the U.S., the Compendium II of Copyright Office Practices clearly states that “[w]orks produced by mechanical processes or random selection without any contribution by a human author is not registrable Similarly, a work owing its form to the forces of nature and lacking human authorship is not registrable.”¹⁰¹ *656 This is not surprising, given that the original purpose of IP protection was about promoting sciences and useful arts. Absent this rationale of promotion and incentive which clearly does not apply to machines, there is no need to award IP protection to the “creator” of said IP subject matter. This approach is further reflected by the widely accepted rule whereby mere ideas do not qualify for copyright protection.¹⁰² These ideas, and rightly so, are deemed to belong to the public domain, i.e. to be accessible to all--a form of accessible commons from which all can benefit. Similarly, copyright law excludes works that result from purely mechanized or random processes.¹⁰³ Indeed, the mere preservation of certain content in the public domain is not needed here and hence, IP rights granted to Hubots for creation derogates from the collective content with no payoff to the creator who does not need incentives to function and/or create new content. With regard to the incentives issue, Ian Hargreaves is skeptical of the benefits of copyright law in the wake of the expansion of IP rights. Hargreaves asks a key question--“Could it be true that laws designed more than three centuries ago with the express purpose of creating economic incentives for innovation by protecting creators' rights are today obstructing innovation and economic growth?”¹⁰⁴ Here I would add, that if this economic skepticism is relevant in the case of human authors vis-à-vis the general public, then how much more relevant is it (and how much more weight should be given to it) when it comes to non-human entities that, as alluded to above, do not need such incentives in order to create.

Acosta suggests a middle ground approach with respect to the use of the public domain.¹⁰⁵ In this view, the determination of whether the Hubot-generated content should be applied to the public domain or not is contingent on the incentives factor.¹⁰⁶ Acosta paints the following distinction:

[i]f allowing AI developers to claim copyrights in their machine's output incentivizes more creative production, legislators should codify this copyright grant in the law. Conversely, if the protection of the machine or its code itself is incentive enough, then works produced by a creative machine ought to flow into the public domain and be fortified against proprietary claims.¹⁰⁷

While this seems like a good approach because it does not commit *657 to a one-sided rule and allows room for deciding cases based on their merits, such a middle ground approach is both costly and ineffective. Furthermore, it is also not warranted given the fact that such Hubots are, by definition, autonomous. This middle ground approach would produce an ad-hoc type régime that could undermine the clarity of how and to whom or what IP rights are granted.

But is the public domain truly the optimal choice here? In my view, the answer to this is a resounding yes! Not only is the public domain the optimal choice, it is also the only logical choice. In order to explain this point, it is important to go back to the basics of IP protection and to understand the idea of placing IP into one of two categories--the private domain and the public domain.

At the beginning of intellectual property, there were ideas and humans who had ideas. Such ideas were translated into content; innovation; and other IP subject matter. Those ideas were part of our collective humanity; they were personal dreams that drove us all forward. They were in the collective ownership of the human library of knowledge, or more technically speaking, in the public domain. Then, people and individuals, and in time, corporations, started to identify the financial power (and other advantages) vested in such knowledge. There was an added value in literature, music, and innovations of all kind. Many people wanted to access them and as a result, were ready to pay in order to gain said access--that became the fuel that drove more content forward. The fire of invention and creativity was, and will always remain, ablaze with or without financial gain; but

that gain was no doubt an incentive to work hard and to invest time, treasure, and talent into developing new IP subject matter. Thus arose the need to ascertain ownership over IP and with that came the emergence of legal constructs to protect said rights. Consequently, amidst the “ocean” of public domain, there arose “islands” that were collectively referred to as the private domain. These islands would only last for a limited time. Indeed, as soon as an island's resources are depleted, or in legal terms, when the protection term expires, it collapses into the ocean of the public domain. Ultimately whatever was constructed on it came to “float” on the ocean of the public domain, and became a free resource for all to use. Indeed, all that is categorized as private domain eventually blends into the public domain.¹⁰⁸ But, crucially, the reverse is not true. The gravitational pull in the IP legal construct is dictated by *658 the public domain. Once the justifications for placing a given IP subject matter in the private domain is exhausted, then that body of IP subject matter is ultimately pulled into the public domain.

But in order to give a more in depth legal reasoning as to why the public domain is the only right choice for content and innovation created by Hubots, I would like to take a deeper look at the public domain from a legal standpoint.¹⁰⁹ According to Jessica Litman, the public domain reserves “raw material of authorship to the commons, thus leaving that raw material available for other authors to use”.¹¹⁰ It is a place where IP rights are limited from entry. What is more, IP subject matter gravitates towards the public domain. Notice how in IP laws around the world as well as international treaties (e.g. Paris and Berne Conventions, and the TRIPS agreement), the duration of IP rights relating to patents, copyrightable content, as well as designs, are limited in time.¹¹¹ The rights are not infinite but rather finite. In fact, the protection that is granted to said subject matter is intended to reward and to incentivize the creators of said subject matter. But the ultimate goal of said protection is that the protected subject matter ends up being part of the collective scientific and/or creative wealth. Despite the fact that at any given point in time, the law determines, with respect to a specific subject matter, if it lies in the private domain or the public domain, the final outcome is always the same. Indeed, the final outcome is that all that has ever been invented, or will ever be invented, and all that has been composed, written, or designed will become part of the collective “human wealth”, indeed, part of the public domain. Thus, if the law cannot justify the delaying of what is inevitable, then that subject matter will immediately revert to the public domain or will always be there to begin with. In fact, it is correct to say that any subject matter that is created is originally found in the public domain unless the owner of said subject matter shows reason to place it, for his advantage, in the private domain for a limited time as prescribed by law.¹¹² There must be a vibrant public domain construct and a good reason why subject matter should qualify for private domain protection.¹¹³ It is also worth mentioning that the public domain construct might be abused in *659 some cases.¹¹⁴ Still, in all, a strong public domain régime is imperative for a viable IP system.¹¹⁵ Therefore, where there is no good cause to grant rights therein, the IP subject matter has to remain in its point of origin--the public domain. Hugh Breakey explains that: “No natural rights theory justifies strong intellectual property rights. More specifically, no theory within the entire domain of natural rights thinking coherently supports strengthening current intellectual property rights.”¹¹⁶

He further argues that “the core mechanisms of natural rights thinking ensure a robust public domain and categorically rule out strong intellectual property rights.”¹¹⁷ But the support for the public domain argument is not only based on romantic notions of IP or on natural law--support can be found in other disciplines as well. The public domain argument is not only founded on a theoretical-moral-normative basis--it also has strong economic support.¹¹⁸ According to Kristopher Erickson's survey, “[a]s intellectual property rights have expanded, resistance has begun to focus on inconsistencies in the economic rationale for expansion of IP law. The language of reform shifted gradually toward protection of the public domain in economic terms, using economic evidence.”¹¹⁹ Erickson states that “[p]romoting a vibrant public domain is thus a normative project with both political and economic justifications.”¹²⁰ He advocates for a shift in how we perceive the public domain. Thus, in his view, instead of portraying the public domain as an “information commons,” we need to ascertain its role as an “instrumentalised engine of economic growth”, and its need to be protected.¹²¹ He posits this makes economic sense because ideas and expressions in the public domain have value.¹²² Eli Salzberger argues that “in order to enhance society's welfare” there needs to be “a significant Public Domain.”¹²³ He explains that “[w]ithout intellectual property, incentives to create will be lacking and scientific progress would cease or significantly slow down, decreasing the welfare of society. However, most new inventions are based on older

ones and thus full propertization of every idea and expression would slow down scientific and cultural progress.”¹²⁴ Effectively, the public domain is “one of the constitutive notions of intellectual property.”¹²⁵ Even more *660 so, in my view, it is the point of equilibrium in a healthy IP policy. The private domain is a temporary status and a transitional stage that is granted only when such a grant is warranted. This balance between the two competing interests is aptly summarized by Andrew Beckerman-Rodau in the following manner:

Intellectual property law has developed legal rules that carefully balance competing interests. The goal has long been to provide enough legal protection to maximize incentives to engage in creative and innovative activities while also providing rules and doctrines that minimize the effect on the commercial marketplace and minimize interference with the free flow of ideas generally.¹²⁶

In this regard, Antony Scott Taubman observes that:

IP law and policy frequently define IP rights by invoking a positive, prior conception of a public domain, the bounds of IP set as allowable exceptions to public domain material that are justifiable on explicit policy grounds. This is how the Statute of Monopolies was drafted, defining patents of invention as exceptions to the rule that otherwise rendered commercial monopolies “utterly void and of none effect.”¹²⁷

Lawrence Lessig is aware of the costs between the protection of IP and other social inserts. His observation, though noted in a different context, is also of relevance here, where he states “No doubt it would be difficult to calculate the proper measure of ‘harm’ to an industry. But the difficulty of making that calculation would be outweighed by the benefit of facilitating innovation.”¹²⁸ It follows that the trade-off that exists in the context of IP rights vis-à-vis the public domain is very real. Also, in some cases, as in our discussion here, the price needs to be paid for the benefit of innovation and other social interests.

A disadvantage that can flow from IP subject matter falling into the public domain is that profit seeking will be hindered.¹²⁹ This is of little significance when Hubots are involved, given that their functioning is not motivated by financial gain.¹³⁰ Notice that this *661 approach is in fact followed in IP laws with respect to recognizing copyrightable or patentable subject matter, or and any other IP subject matter, including trade secrets and trademarks designs. Indeed, if the owner of said subject matter fails to transcend the conditions that are set by law for acquiring rights over the specific subject matter, then he is not privileged to receive the rights and the limited monopoly that he is granted over his innovation and creativity.¹³¹ The burden is on the creator of the work or innovator to show good reason why his creation is worthy of protection, and why it should be moved to the private domain (for a limited time). That is why various elements are not covered by IP protection and effectively remain in the public domain, such as ideas in copyright, mathematical formulas in patent law, generic names in trademarks, and “functionally dictated” designs in the case of passing off.¹³²

In copyright discourse, the public domain narrative carries much weight--so much that in order to take from the public domain, there must be good reason based on valid IP based rationales. According to Yochai Benkler, “enforcing property rights in information is permissible, but only if the government can persuade the courts that it has very good reasons to impose the restrictions on access to and use of information necessary to effectuate these property rights.”¹³³ Consider the context of sports games and events--even here the performance of athletes, facts, and information generated in sports are all deemed to belong to the public domain given that they are viewed as mere facts and news of the day under copyright law. A limited copyright is granted for the organizers of such events but mostly in the context of broadcasting rights as well as databases and compilation of facts.¹³⁴ They are generally based on the idea of providing incentives to the organizers and to secure that the fruits of their

labor are not taken by ***662** another party, thus fostering an environment of unfair competition.¹³⁵ Notice that in these cases, the incentive theory constitutes the pillar of the entire legal construct over which IP rights are established. Thus, in the case of machines where incentives are non-existent, this idea of providing IP protection would not be relevant. The presence of the public domain is not only a national issue residing in national laws, it is also an international issue that carves the scope of IP regulation around the world. In fact, the public domain is deemed to complement private property in IP law--the public domain construct and private property both contribute towards improve the human condition.¹³⁶ Taubman observes “[a] review of the treaties from a public domain perspective illustrates that the IP policymakers' two cognate tasks - defining exclusive rights or prerogatives to generate certain public goods, and defending a healthy public domain - is not a static zero-sum game.”¹³⁷ I agree with this and contend that in this case, I propose that all IP byproducts of Hubots need to be placed in the public domain because nothing is being taken from the private domain to begin with. Along this line of reasoning, I think that it is also possible to equate protection of IP subject matter made by Hubots to the “copyrighting of culture.”¹³⁸ That is because their byproducts are part of humanity's general progress in scientific achievement and specifically, in creating robots that can create new things for us. In another context, Rosemary Coombe submits that the “‘copyrighting of culture’ will only further imperil the public domain; it may enable elites to enforce forms of censorship within communities; it has the potential to freeze cultural identities, and shut down desirable hybridities.”¹³⁹ In this regard, Coombe highlights the need that is prevalent today--to revitalize the “cultural public domain.” I believe that the type of products Hubots produce fit well and qualify to be placed in this “cultural public domain.” On a similar note, Deven Desai highlights the importance of the collective society at large when it comes to the extent or term of protection of copyright. In his view,

when one examines the dominant theories offered to justify copyright--from Lockean labor to Hegelian personhood to utilitarian theories--no justification for descensible copyright is found. Nonetheless the analysis of this material offers a way to understand ***663** that another heir, society, ought to be considered in copyright policy as a matter of intergenerational equity.¹⁴⁰

Desai further emphasizes “creativity is a communal, feedback-driven process involving a give and take between the current generation and previous generations” and “the longer inputs to creativity are locked up, the more creativity and innovation are hindered and harmed rather than increased.”¹⁴¹

It follows then, for the purposes of our discussion, that in the case of IP subject matter that is created by Hubots, their products fail to meet that threshold not because, technically speaking, they do not meet the formal requirements of the IP law, but more so because they do not necessitate protection, given the non-human nature of the entity that made them. The human narrative of IP is not surprising--after all, just as animals cannot have IP rights, in and of themselves, so too robots and even Hubots should not. Coombe highlights the human rights aspect of IP both in the context of owning IP and of sharing it within the public domain. In her view, “Intellectual property rights are human rights, as are rights of access to the public domain, rights of collectivities to maintain their cultural integrity and to participate in decisions involving the use of their cultural heritage.”¹⁴² Both owning IP and sharing it within the public domain, revert to humans and both aim at improving the human condition and that is how they should be dealt with. Thus, the separation of human and Hubot, in this narrow context (and in general), is of crucial importance. The entire IP construct is founded on the idea that subject matter should be protected. That need, whether as a reward for effort or as an incentive, does not exist for machines. As such, the entire private domain construct cannot stand from the outset. Thus, the subject matter remains at its point of origin--in the public domain. In a nutshell, all IP subject matter originates in the public domain and eventually ends up in the public domain. Such subject matter is moved by legal privileges to the private domain, if and only if, there is good reason, as dictated by laws and the underlying theories, to do so. Retaining the IP subject matter that is produced by Hubots in the public domain is not a manifestation of the “tragedy of the commons.”¹⁴³ On the contrary, in the case of such subject matter, the ***664** public domain would be the driver. This is very clear in the context of IP-generating Hubots, where there is no clash between incentives and public interest considerations, such as access to the IP subject matter.

Absent the incentive and effort arguments, we are left with a clear one-sided approach to the issue whereby economic logic dictates that all such products need to be placed in the domain where they generate most value.

In these cases, evidently, that domain is the public domain. It is where such subject matter could most effectively be utilized in order to generate value from new knowledge and ideas that are themselves based on the existing IP subject matter. In this economic analysis of the public domain, the question is not only about limiting IP rights but also about economic welfare. Landes and Posner explain that it is important to consider the impact of copyright protection on the quantity of new works created.¹⁴⁴ Landes and Posner predict that in situations of elevated levels of copyright protection, “[t]he effect would be to raise the cost of creating new works--the cost of expression, broadly defined--and thus, paradoxically, perhaps lower the number of works created.”¹⁴⁵ The goal of promoting innovation can support arguments for protecting or expanding the public domain. The grant of additional intellectual property rights is not always determined to be an appropriate policy solution.¹⁴⁶ Erickson refers to two main rationales for expanding the public domain: first, expanding the public domain would reduce transaction costs (absent burdensome private rights); second, it would encourage growth because “the most important users of the public domain are innovators”¹⁴⁷ As I have alluded to earlier, this is very much true in the case of IP subject matter that is produced by Hubots, because Hubots’ “interests” do not contradict with these rationales.

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.¹⁴⁸ Article 13 of TRIPS *665 states that: “[m]embers shall confine limitations or exceptions to exclusive rights to certain special cases which do not conflict with a normal exploitation of the work and do not unreasonably prejudice the legitimate interests of the right holder.”¹⁴⁹ 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.

III. Why Robots Cannot be Considered to be Equal to Humans?

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. My position is that there is a great unbridgeable divide between humans and Hubots, no matter how sophisticated the later become. My position is based on two primary reasons¹⁵⁰--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, I will examine 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.¹⁵¹ But notice that this outcome flows not from the present state of the person, but rather to *the person* who is in that given state. The qualifying factor in both cases is not death or the *666 lack of consciousness, but rather that the individual is, or was, a living conscious human before said state of affairs ensued. Thus, these two cases do not justify equating the granting of rights to robots to the rights that are granted to the deceased (by way of respect for their remains and their will) or to unconscious people who lack awareness (at a certain period of time).

In both cases, the human right is granted to the human no matter what his condition is at the time. Now that this distinction has been made, I would like to examine the two conditions of life and awareness in the context of Hubots.

According to Frederic Py,

Alive is a concept applied to biologic entities and actually the only thing they really have in common: life is what distinguishes biological species from the rest of the universe. A machine, at least the one we have right now and in the foreseeable future, are not a biological entity so it probably will never be considered as alive.¹⁵²

Although the observation is logical, I think that it is rather simplistic. Consider a case where a robot is able to energize itself, to rebuild and fix any part therein, and to even build similar Hubots in its “own image.” Could we not say then that the robot fits the description of “alive?” But is life only limited to our physical existence or should one also look at the essence of life--some form of spiritual existence or what people of faith refer to as the soul? Obviously, trying to answer these questions is impossible, with the use of only legalistic reasoning. It might be possible to theorize and consider various options and beliefs, but this discussion is beyond the scope of this Article. Still, the word “alive” denotes a notion of existence that terminates with death. In the case of machines, this does not seem to apply as they are neither alive nor do they die. To say that the machine is alive is to say that it is functioning as a part of nature, whereas a Hubot would never fit into that definition no matter how superior or intricate it is. I would like to offer another definition of life which sets robots apart from humans, and all living things for that matter. When robots “perish” they become parts made of materials that do not blend back into nature. All true living things blend back into nature and give back to nature as they decompose. They are part of a cycle of nature that all living organisms are part of. So the best way to determine what life is, is to contrast it with what transpires to the dead physical entity after death.¹⁵³

*667 Py observes that “consciousness is a concept even harder to define, let alone identify, than intelligence.”¹⁵⁴ Indeed, consciousness is about being aware of our place in the world around us. According to Bobby Azarian, “brains and computers work very differently. Both compute, but only one understands--and there are some very compelling reasons to believe that this is not going to change. It appears that there is a more technical obstacle that stands in the way of Strong A.I. ever becoming a reality.”¹⁵⁵ Azarian adds that:

Since as early as the 1960s, A.I. researchers have been claiming that Strong A.I. is just around the corner. But despite monumental increases in computer memory, speed, and processing power, we are no closer than before. So for now, just like the brainy sci-fi films of the past that depict apocalyptic A.I. scenarios, truly intelligent robots with inner conscious experience remain a fanciful fantasy.¹⁵⁶

Even in the grand scheme of things, the question or treatment of Hubots as humans is not simply limited to the legalistic or philosophical realms--to some it even appears existential. In this context, even the most avid of scientists, innovators, and visionaries are very concerned, to say the least, about the full blown independent A.I. For example, innovator and visionary, Elon Musk, refers to this bluntly as “summoning the demon.”¹⁵⁷ He expresses concern about creating robots with deep intelligence that may even possess awareness.¹⁵⁸ A similar warning was also given by Bill Gates.¹⁵⁹ Furthermore, in an interview, Stephen Hawking told BBC News that “the development of full artificial intelligence could spell the end of the human race.”¹⁶⁰ I find myself largely agreeing with this position as professed by Gates, Musk and Hawking. It is worth noting that not all agree with their view and *668 think it to be exaggerated.¹⁶¹ I predict that the warnings expressed by Gates, Musk, and Hawking will ultimately not be heeded. This is due to the nature of innate human curiosity. It is my belief that humanity will not rest until it explores the world of A.I to the point of no return--it is simply too amazing and enticing for humans to withstand the temptation. But it is this innate curiosity that could eventually bring our collective demise. Nick Bostrom also warns that “[o]nce unfriendly

superintelligence exists, it would prevent us from replacing it or changing its preferences. Our fate would be sealed.”¹⁶² That is why human made laws must not tolerate the idea of granting IP rights, or any other rights for that matter, to robots lest we end up diluting the cardinal difference between humans and Hubots and, ultimately, end up being overrun by machines with consciousness. Granted, this dire warning seems far-fetched at this point, but the nature of human innovation and innate curiosity is bound to lead to this inevitable outcome, and, as such, it needs to be preempted from the outset by the law.

Conclusion

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.

Footnotes

- ^{d1} Permission is hereby granted for noncommercial reproduction of this Article in whole or in part for education or research purposes, including the making of multiple copies for classroom use, subject only to the condition that the name of the author, a complete citation, and this copyright notice and grant of permission be included in all copies.
- ¹ Senior Lecturer, Faculty of Law, Tel Aviv University.
- ² Robert M. Geraci, *Apocalyptic AI: Visions of Heaven in Robotics, Artificial Intelligence, and Virtual Reality*, (2010), https://books.google.co.il/books?hl=en&lr=&id=2u0VDAAQAQBAJ&oi=fnd&pg=PR7&dq=legal+rights+for+robots+%20bots&sig=5yGxm9PXLmdUlsSpvMBEIXpv4h4&redir_esc=y#v=onepage&q=legal%20rights%CC20for%20robots&f=false.
- ³ NewTech HD, *5 New Technology 2016 | Military Robots | Awesome Robots*, YouTube (Jan. 22, 2016), <https://www.youtube.com/watch?v=CoGePDHxKNk>.
- ⁴ For more on nanotechnology, see Michael Abuita, *Nanotechnology | Next Future Technology Having No Limits - Full Documentary*, YouTube (Sept. 3, 2016), https://www.youtube.com/watch?v=BAf-T_PC69Q; see also John McCarthy, *Basic Questions, What is Artificial Intelligence?*, Stan. U., <http://www-formal.stanford.edu/jmc/whatisai/node1.html> (revised Nov. 12, 2007).
- ⁵ Raquel Acosta, *Artificial Intelligence and Authorship Rights* JOLTdigest (Feb. 17, 2012), <http://jolt.law.harvard.edu/digest/artificial-intelligence-and-authorship-rights>.
- ⁶ *Id.*
- ⁷ Contact Info, *Amazing Robot Becomes Self-Aware (Explained)*, YouTube (Jul. 18, 2015), <https://www.youtube.com/watch?v=jx6kg0ZfhAI>. For comments on this experiment, see Celena Chong, *This robot passed a 'self-awareness' test that only humans could handle until now*, Tech Insider (Jul. 23, 2015), <http://www.businessinsider.com/this-robot-passed-a-self-awareness-test-that-only-humans-could-handle-until-now-2015-7>; Christopher Hooton, *A robot has passed a self-awareness test*, Independent (Jul. 17 2015), <http://www.independent.co.uk/life-style/gadgets-and-tech/news/a-robot-has-passed-the-self-awareness-test-10395895.html>; see also, ColdFusion, *Are We Approaching Robotic Consciousness?*, YouTube (Sep. 4, 2015), <https://www.youtube.com/watch?v=JTOMNkZJRao>.

- 8 Some of the examples of AI and Hubots from literature and the movie industry include *Surrogates* (Touchstone Pictures 2009), *H.A.L. 9000* from 2001: *A Space Odyssey* (Metro-Goldwyn-Mayer 1968), *Her* (Warner Bros. Pictures 2013), *Tomorrowland* (Walt Disney Pictures 2015), *The Terminator* (Orion Pictures 1984) and its se quels, *RoboCop* (Orion Pictures 1987) and its sequels, and *I, Robot* (Twentieth Century FoxXXX 2004).
- 9 As an example, there are already a number of major corporations reportedly engaged in the research and development of Autonomous Cars. See 33 *Corporations Working on Autonomous Vehicles*, CB Insights (Aug. 11, 2016), <https://www.cbinsights.com/blog/autonomous-driverless-vehicles-corporations-list/>.
- 10 For example see, Hod Lipson and Melba Kurman, *Driverless: Intelligent Cars and the Road Ahead*, MIT Press, (2016), <https://www.amazon.com/Driverless-Intelligent-Cars-Ahead-Press/dp/0262035227>, and John Pugliano, *The Robots are Coming: A Human's Survival Guide to Profiting in the Age of Automation*, Ulysses Press, (2017), https://www.amazon.com/Robots-are-Coming-Profiting-Automation/dp/1612436692/ref=sr_1_fkmr0_3?s=books&ie=UTF8&qid=1493016405&sr=1-3-fkmr0&keywords=GUTURE+JOBS+IN+AGE+OF+ROBOTS.
- 11 David Allen Larson, *Artificial Intelligence: Robots, Avatars and the Demise of the Human Mediator*, 25 Ohio St. J. on Disp. Resol. 105 (2010).
- 12 Ross M. Miller, *Don't Let Your Robots Grow Up to Be Traders: Artificial Intelligence, Human Intelligence, and Asset-Market Bubbles*, 68 J. Econ. Behav. & Org. 153 (2008).
- 13 Vik Kanwar, *Post-Human Humanitarian Law: The Law of War in the Age of Robotic Warfare*, 2 Harv. J. of Nat'l Sec., 1 (2011), https://papers.ssrn.com/sol3/papers.cfm?abstract_id=1619766;
- 14 See Acosta, *supra* note 5.
- 15 See A.M. Turing, *Computing Machinery and Intelligence*, 59 Mind 433-60 (1950), <http://phil415.pbworks.com/f/TuringComputing.pdf>; see also Timothy McGettigan, *The Turing Test: An Enduring AI Standard*, in *Good Science: The Pursuit of Truth and the Evolution of Reality*, <https://ssrn.com/abstract=2277136>.
- 16 Turing, *supra* note 15.
- 17 See Acosta *supra* note 5 for various examples of these robot machines. Specifically, the Chatterbot, Jabberwacky, utilized ML techniques to fine-tune responses. *AI by icogno.com*, Jabberwacky.com, <http://www.jabberwacky.com> (last visited Mar. 21, 2017). More significantly, IBM's Watson which employs NLP technology, won *Jeopardy!* against two reigning champions. It is worth noting that even these impressive achievements remain in the realm of data mining. Watson, with its immense database and impressive ability to process huge masses of data, still lacked reasoning. Although in an overwhelming majority of cases, it got the question right, when it erred, it did so in a major way, deviating from any reasonable answer. This provides additional proof that AI still has some way to go before it reaches full rationalization, or what Acosta refers to as “weak AI.” *The DeepQA Research Team*, IBM, <http://www.research.ibm.com/deepqa/faq.shtml#20> (last visited Mar. 21, 2017). For a discussion on IBM, Watson and Jeopardy!, see Acosta, *supra* note 5.
- 18 Acosta *supra* note 5. For more on the science behind intelligent AI see, Jeff Hawkins & Sandra Blakeslee, *On Intelligence* 207-10 (2004); see also Sean R. Eddy, *What is a hidden Markov Model?*, 22 Nature Biotechnology 1315, 1315-16 (2004).
- 19 Acosta, *supra* note 5.

- ²⁰ James S. Albus, *Outline for a Theory of Intelligence*, 21 *IEEE Transactions on Systems, Man and Cybernetics* 473 (May/June 1991); A. Meystel, *Autonomous Mobile Robots: Vehicles with Cognitive Control* (1991).
- ²¹ Albus *supra* note 20.
- ²² Ralph D. Clifford, *Intellectual Property in the Era of the Creative Computer Program: Will the True Creator Please Stand Up?*, 71 *Tul. L. Rev.* 1675, 1676-77 (1997). The “Creativity Machine” was a system known as a neural network enabling a computer to create artistic and inventive works. *Id.*
- ²³ For more on the development and abilities of intelligent machines, see *id.* at 1678-79.
- ²⁴ Madeleine de Cock Buning, Chair, Dutch Media Authority/Utrecht University Centre for Intellectual Property Law, Keynote Address at the 16th Eur. Intell. Prop. Inst. Network Congress 2014/2015 (Jan. 29-31, 2015) (as reported by Muzdalifah Faried Bakry & Zhilang He, *Autonomous Creation - Creation by Robots: Who owns the IP Rights?*, Maastricht University Blog Intell. Prop. & Knowledge Mgmt. (Mar. 15, 2015), <https://law.maastrichtuniversity.nl/ipkm/autonomous-creation-creation-by-robots-who-owns-the-ip-rights/>). For more on the development of robots possessing artificial intelligence, see Intelligent Autonomous Systems 13: Proceedings of the 13th International Conference IAS-13 (E. Menegatti, et al. eds., 2016). See also Andrew J. Wu, *From Video Games to Artificial Intelligence: Assigning Copyright Ownership to Works Generated by Increasingly Sophisticated Computer Programs*, 25 *AIPLA Q.J.* 131, 156 (1997).
- ²⁵ Nils J. Nilsson, *Principles of Artificial Intelligence* (1980).
- ²⁶ Matthew L. Ginsberg, *Multivalued Logics: A Uniform Approach to Reasoning in Artificial Intelligence*, 4 *Computational Intelligence* 265 (1988).
- ²⁷ Intelligent systems should, to some extent, be able to learn to perform given tasks and make decisions depending on demands with different conditions. AIs would be the next step in the development of a more sustainable information society. See Intelligent Autonomous Systems: Foundations and Applications (Dilip Kumar Pratihar, Dilip Kumar ed. 2010).
- ²⁸ Examples of these companies include: AMS AG, Robotics Trends, http://www.robotictrends.com/company/ams_ag/ (last visited Mar. 27, 2017); INF Robotics, Robotics Trends, http://www.robotictrends.com/company/boston_dynamis/ (last visited Mar. 27, 2017); Softbank Robotics, Robotics Trends, http://www.robotictrends.com/company/aldebaran_robotics/ (last visited Mar. 27, 2017); Johnson Space Center Engineering, NASA, https://www.nasa.gov/centers/johnson/engineering/robotics_simulation/ (last visited Mar. 27, 2017); Honda, <http://world.honda.com/HondaRobotics/> (last visited Mar. 27, 2017); Aldebaran Robotics, Softbank Robotics, <https://www.aldebaranrobotics.com/en> (last visited Mar. 27, 2017); Partner Robot, Toyota, http://www.toyota-global.com/innovation/partner_robot/ (last visited Mar. 27, 2017); AI x Robotics, Sony, https://www.sony.net/SonyInfo/Careers/IJCAI16_Career/ (last visited Mar. 27, 2017); Sarcos, <http://www.sarcos.com/> (last visited Mar. 27, 2017); ROBOTIS, <http://en.robotis.com/index/> (last visited Mar. 27, 2017); Samsung, Robotics Business Review, <https://www.roboticsbusinessreview.com/company/samsung/> (last visited Mar. 27, 2017). For more on the astounding headway already made see: EAston, *Top 10 Humanoid Robots Designed To Match Human Capabilities And Emotions*, WT VOX (Mar. 24, 2015), <https://wtvox.com/robotics/top-10-humanoid-robots/>.
- ²⁹ Intelligent Autonomous Systems *supra* note 24.
- ³⁰ Syed V. Ahamed, *The Architecture of a Wisdom Machine (WM)*, 5 *International Journal of Smart Engineering System Design* 537 (2003).

- 31 Kate Darling, *Extending Legal Protection to Social Robots: The Effects of Anthropomorphism, Empathy, and Violent Behavior Towards Robotic Objects*, in *Robot Law* (Ryan Calo, et al. 2016).
- 32 David Allen Larson, *Artificial Intelligence: Robots, Avatars and the Demise of the Human Mediator*, 25 Ohio St. J. Disp. Resol. 105 (2010), <https://ssrn.com/abstract=1461712>; Marvin Minsky, *The Emotion Machine: Commonsense Thinking, Artificial Intelligence, and the Future of the Human Mind* (2007).
- 33 Fred Glover, *Future Paths for Integer Programming and Links to Artificial Intelligence*, 13 Computers & Operations Research 533 (1986).
- 34 See e.g., Clifford, *supra* note 23, at 1675-703; Buning, *Keynote Address, supra* note 24; see also J. Larrieu, *Robots and intellectual property* [Article in French], 24 J. Int. Bioethique 125-133 (Dec. 2013) (abstract available in English at <http://www.ncbi.nlm.nih.gov/pubmed/24558740>). The paper reflects thoughts and questions regarding the nature of IP output by intelligent Robots. (“The robots, as the physical embodiment of artificial intelligence, are becoming more and more autonomous. Robot-generated works include less and less human inputs. Are these objects created or invented by a robot copyrightable or patentable? To whom the ownership of these IP rights will be allocated? To the person who manufactured the machine? To the user of the robot? To the robot itself”) *Id.*; see also Finnegan, *Intellectual Property Considerations for the Robotics Industry*, <https://www.roboticsbusinessreview.com/download/intellectual-property-considerations-robotics-industry/> (last visited Mar. 27, 2017); Glover, *supra* note 33.
- 35 Mario Tremblay, *Should Robots Have Legal Rights?*, RobotShop (Nov. 23, 2015), <http://www.robotshop.com/blog/en/should-robots-have-legal-rights-17333>.
- 36 David Levy, *Robots Unlimited: Life in a Virtual Age* (2005).
- 37 Ryan Calo, *Robots in American Law*, U. Wash. Research Paper No. 2016-04 (2016) (discussing a few of these cases). Calo explains that “courts have had to decide whether robots represent something ‘animate’ for purposes of import tariffs, whether robots can ‘perform’ as that term is understood in the context of a state tax on performance halls, and whether a salvage team ‘possesses’ a shipwreck it visits with an unmanned submarine.” *Id.*
- 38 *Id.*
- 39 See Phil McNally & Sohail Inayatullah, *The Rights of Robots: Technology, culture and law in the 21st century*, 20 Futures 119 (Apr. 1988).
- 40 Neil M. Richards & William D. Smart, *How Should the Law Think About Robots?*, in *Robot Law 3* (Ryan Calo, et al. 2016).
- 41 David Levy, *The Ethical Treatment of Artificially Conscious Robots*, 1 Int'l J. of Soc. Robotics 209 (2009); Darling, *supra* note 31; Jason P. Doherty, *AI Civil Rights: Addressing Artificial Intelligence and Robot Rights* (2016).
- 42 Jennifer Robertson, *HUMAN RIGHTS VS. ROBOT RIGHTS: Forecasts From Japan*, 46 Critical Asian Studies 571 (2014), <http://www.tandfonline.com/doi/full/10.1080/14672715.2014.960707?scroll=top&needAccess=true>. Robertson has some profound observations, namely that, “Japan continues to be in the vanguard of human-robot communication and, since 2007, the state has actively promoted the virtues of a robot-dependent society and lifestyle. Nationwide surveys suggest that Japanese citizens are more comfortable sharing living and working environments with robots than with foreign caretakers and migrant workers. As their population continues to shrink and age faster than in other postindustrial nation-states, Japanese are banking on the robotics industry to reinvigorate the economy and to preserve the country’s alleged ethnic homogeneity. These initiatives are paralleled by a growing support among some roboticists and politicians to confer citizenship on robots The possibility of robots acquiring civil status ahead

of flesh-and-blood humans raises profound questions about the nature of citizenship and human rights. Already the idea of robots having evolved beyond consideration as ‘property’ and acquiring legal status as sentient beings with ‘rights’ is shaping developments in artificial intelligence and robotics outside of Japan, including in the United States.” *Id.*

43 I specifically refrain from using “cause” here.

44 Jordan Zlatev, *The Epigenesis of Meaning in Human Beings, and Possibly in Robots*, 11 *Minds and Machines* 155 (May 2001), <http://link.springer.com/article/10.1023/A%3A1011218919464>. In his article, Zlatve addresses the question, “Can a machine use language meaningfully and if so, how can this be achieved?” In his view, “[f]ollowing the principle of epigenetic development, robotogenesis could possibly recapitulate ontogenesis, leading to the emergence of intentionality, consciousness and meaning.” *Id.*

45 Tremblay, *supra* note 35.

46 Benoit Dupont, *The Cyber Security Environment to 2022: Trends, Drivers and Implications* (2012), https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2208548; Ishaani Priyadarshini, *Cyber Security Risks in Robotics, in Detecting and Mitigating Robotic Cyber Security Risks* 333 (2017); Armin Krishnan, *Robots, Soldiers, & Cyborgs: The Future of Warfare*, Footnote (Oct. 24, 2013), <http://www.footnote1.com/robots-soldiers-cyborgs-the-future-of-warfare/>.

47 Nicklas Lundblad, *e-Exclusion and Bot Rights: Legal aspects of the robots exclusion standard for public agencies and other public sector bodies with Swedish examples*, 12 *First Monday* (Aug. 6, 2007), <http://ojs-prodlib.cc.uic.edu/ojs/index.php/fm/article/view/1974/1849#author>.

48 F. Patrick Hubbard, *‘Sophisticated Robots’: Balancing Liability, Regulation, and Innovation*, 66 *Fla. L. Rev.* 1803 (2014), http://scholarcommons.sc.edu/cgi/viewcontent.cgi?article=2027&context=law_facpub.

49 According to these “laws” authored by Isaac Asimov, a robot: (1) may not harm a human being, or, through inaction, allow a human being to come to harm; (2) must obey the orders given to it by human beings, except where such orders would conflict with the First Law; and (3) must protect its own existence, as long as such protection does not conflict with the First or Second Law. Isaac Asimov, *Runaround*, in *Isaac Asimov, The Complete Robot* (1995).

50 For a discussion on the regulation of robot behaviors, see Ronald E. Leenes & Federica Lucivero, *Laws on Robots, Laws by Robots, Laws in Robots: Regulating Robot Behavior by Design*, 6 *Law, Innovation and Technology* 194-222 (2014), https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2546759.

51 Gabriel Hallevy, *AI v. IP - Criminal Liability for Intellectual Property IP Offenses of Artificial Intelligence AI Entities* 2 (Nov. 17, 2015), http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2691923.

52 Sabine Gless, Emily Silverman, & Thomas Weigend, *If Robots Cause Harm, Who is to Blame? Self-Driving Cars and Criminal Liability* (Jan. 29, 2016), <https://ssrn.com/abstract=2724592>; Ryan Abbott, *The Reasonable Computer: Disrupting the Paradigm of Tort Liability*, 86 *Geo. Wash. L. Rev.* 1 (January, 2018); Richard Kelley et al., *Liability in Robotics: An International Perspective on Robots as Animals*, 24 *Advanced Robotics* 1861 (2010); Andrea Bertolini, *Robots as Products: The Case for a Realistic Analysis of Robotic Applications and Liability Rules*, 5 *Law Innovation and Technology* 214 (2013).

53 Woodrow Hartzog, *Unfair and Deceptive Robots*, 74 *Md. L. Rev.*, 785 (2015).

54 Machine Ethics (M. Anderson & S.L. Anderson, 2011). In the introduction to this collections of research papers, Anderson and Anderson assert that “[i]t is not always obvious to laypersons or designers of machines that the behavior of the sort of machines to

which we would like to turn over necessary or desired tasks has ethical import. If there is a possibility that a human being could be harmed should the machine behave in certain manner, then this has to be taken into account.”

- 55 Peter M. Asaro, *Robots and Responsibility from a Legal Perspective*, in *Proceedings of the IEEE* 20 (Apr. 14, 2007), <http://www.peterasaro.org/writing/asaro%20legal%20perspective.pdf>.
- 56 Vikramaditya S. Khanna, *Corporate Criminal Liability: What Purpose Does it Serve?*, 109 *Harv. L. Rev.* 1477 (1996); Claire A. Hill & Richard W. Painter, *Berle's Vision Beyond Shareholder Interests: Why Investment Bankers Should Have (Some) Personal Liability*, 33 *Seattle U. L. Rev.* 1173 (2010); Henry Hansmann, Reinier Kraakman, & Richard Squire, *Law and the Rise of the Firm*, Yale L. & Econ. Res. Paper No. 326 (Jan. 2006).
- 57 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). *See also* Acosta *supra* note 5.
- 58 Randolph J. May & Seth L. Cooper, *Intellectual Property Rights Under the Constitution's Rule of Law*, 9 *Persp. from FSF Scholars* (2014), https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2509516; Rochelle Cooper Dreyfuss, *Does IP Need IP? Accommodating Intellectual Production Outside the Intellectual Property Paradigm*, 31 *Cardozo L. Rev.* 1437 (2010).
- 59 *See supra* note 58.
- 60 *Id.*
- 61 Brian L. Smiler & Frederic H. Erbis, *Introduction to Intellectual Properties*, in *Intellectual Property Rights in Agricultural Biotechnology* (F.H. Erbis & K.M. Maredia eds. 2004); C. Geiger et al., *Introduction to Intellectual Property Law* (4th ed. 2001).
- 62 Tremblay, *supra* note 35.
- 63 Peter Drahos, *A Philosophy of Intellectual Property* (1996); Edwin C. Hettinger, *Justifying Intellectual Property*, 18 *Phil. & Pub. Affairs* 31 (1989); William Fisher, *Theories of Intellectual Property*, in *New Essays in the Legal and Political Theory of Property* (2001). For more on the nature of these rights, see Robert L. Ostergard, *Intellectual Property: A Universal Human Right?*, 21 *Human Rights Q.* 156 (1999).
- 64 *Id.*
- 65 *Id.*
- 66 *Id.*
- 67 *Id.*
- 68 In this regard, I would like to make a distinction between the subject matter of creativity and innovation that is generated by Hubots, and between the information that has accumulated by the makers of said robots in order to better improve them. While the first should not be the subject of human ownership (as I have argued above), the latter is indeed IP of another type. It intrinsically reverts back to those that are developing such robots and making their functions better and more efficient. These latter pieces of information are

indeed fair game when it comes to robotics--they qualify for human ownership because humans are those that produce this information and data.

- 69 For more on the idea of human liability for the actions of their robots, see Keith Kirkpatrick, *Legal Issues with Robots*, 56 Comm. of the ACM 17 (Nov. 2013); *see also* Enrique Schaerer, Richard Kelley & Monica Nicolescu, Robots as Animals: A Framework for Liability and Responsibility in Human-Robot Interactions, 18th IEEE Symposium on Robot and Human Interactive Communication, Toyoma, Japan (2009).
- 70 James Grimmelmann, *Copyright for Literate Robots*, 101 Iowa L. Rev. 657 (2016).
- 71 Acosta, *supra* note 5.
- 72 *Id.* See William T. Ralston, *Copyright in Computer-Composed Music: Hal Meets Handel*, 52 J. Copyright Soc'y U.S.A. 281, 292-93 (2005). *See also* Mireille Bert-Jaap Koops, et al., *Bridging the Accountability Gap: Rights for New Entities in the Information Society?*, 11 Minn. J.L. Sci. & Tech. 497, 549-50 (2010).
- 73 For a discussion on the connection between incentives and behavior, particularly with regard to creativity, see Christopher Buccafusco et al., *Experimental Tests of Intellectual Property Laws' Creativity Thresholds*, 93 Tex. L. Rev. 1921 (2014).
- 74 *Id.*
- 75 In many ways, computational creativity involves the ability of a machine to process basic building blocks like letters, colors, and notes, in a novel combination.
- 76 Clifford, *supra* note 23.
- 77 *See* Part II.B.
- 78 Acosta, *supra* note 5.
- 79 *Id.*
- 80 For more on the theories that underlie protection for intellectual property rights, see William Fisher, *Theories of Intellectual Property*, in *New Essays in the Legal and Political Theory of Property* 168 (Stephen Munzer, ed. 2001); *see also* Justin Hughes, *The Philosophy of Intellectual Property*, 77 Geo. L.J. 287 (1988).
- 81 *Id.*
- 82 *Id.*
- 83 *Id.*
- 84 *Id.*

- 85 Id.
- 86 See Margaret Jane Radin, *Property and Personhood*, 34 Stanford L. Rev. 957 (1982); see also Jeanne L. Schroeder, *Unnatural Rights: Hegel and Intellectual Property*, 60 U. Miami L. Rev. 453 (2005).
- 87 Natalie C. Suhl, Moral Rights Protection in the United States under the Berne Convention: A Fictional Work, 12 Fordham Intell. Prop. Media & Ent. L.J. 1203 (2001).
- 88 Jeanne C. Fromer, *Expressive Incentives in Intellectual Property*, 98 Virginia Law Review 1745 (2012); Elizabeth Rosenblatt, *Intellectual Property's Negative Space: Beyond the Utilitarian*, 40 Fla. St. U. L. Rev. 441 (2013); Mark A. Lemley, *Ex Ante Versus Ex Post Justifications for Intellectual Property*, 71 U. Chi. L. Rev. 129 (2004).
- 89 U.S. Const. art. I, § 8, cl. 8.
- 90 Dennis S. Karjala, *Copyright and Creativity*, 15 UCLA Ent. L. Rev. 169, 172-73 (2008).
- 91 For more on the debate on the question if robots can be considered to be alive, see Phil McNally & Sohail Inayatullah, *The Rights of Robots: Technology, Culture and Law in the 21st Century*, 20 Futures 119 (1988); Kerstin Dautenhahn, *Robots We Like to Live With?!- A Developmental Perspective on a Personalized, Life-Long Robot Companion*, 13th IEEE International Workshop on Robot and Human Interactive Communication in Kurashiki, Okayama Japan (Sept. 20-22, 2004).
- 92 Ryan Calo, *Robots in American Law*, U. Wash. Sch. L. Res. Paper No. 2016-04 (2016), http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2737598.
- 93 Comput. Assoc. Int'l, Inc. v. Altai, Inc., 982 F.2d 693 (2d Cir. 1992).
- 94 Id.
- 95 Buning, Keynote Address, *supra* note 24.
- 96 Id.
- 97 Id.
- 98 Rosemary J. Coombe, *Fear, Hope, and Longing for the Future of Authorship and a Revitalized Public Domain in Global Regimes of Intellectual Property*, 52 DePaul L. Rev. 1171 (2003); Gary P. Pisano & David J. Teece, How to Capture Value from Innovation: Shaping Intellectual Property and Industry Architecture, 50 Cal. Mgmt. Rev. 278 (2007); Keith Aoki, Authors, Inventors and Trademark Owners: Private Intellectual Property and the Public Domain, Part I, 18 Colum.-VLA J. L. & Arts 19 (1993).
- 99 Kristofer Erickson, *Defining the public domain in economic terms-- approaches and consequences for policy*, 10 Nordic Journal of Applied Ethics 1 (2016), http://www.ntnu.no/ojs/index.php/etikk_i_praksis/article/view/1951/1986.
- 100 Id. For an example of a global website that functions as a public domain resource, see Wikipedia, <https://www.wikipedia.org/> (last visited Mar. 27, 2017).

- 101 Compendium II: Compendium of Copyright Office Practices § 503.03(a). This follows the recent monkey selfie controversy where a San Francisco court did not grant a copyright to the monkey that took the selfie. It held that while the protection of law could be extended to animals, there was no indication that such protection could be extended to cases involving copyright. *See* Monkey selfie case: judge rules animal cannot own his photo copyright, *The Guardian* (Jan. 6, 2016), <https://www.theguardian.com/world/2016/jan/06/monkey-selfie-case-animal-photo-copyright>; *see* *Naruto v. David John Slater*, 15-cv-04324-WHO (N.D. Cal. Jan. 28, 2016), and the subsequent appeal that was filed by PETA in March 2016. *Naruto v. David John Slater*, 16-15469 (9th Cir. Aug. 25, 2016).
- 102 17 U.S.C. § 102(b).
- 103 Ralston, *supra* note 7, at 292-93.
- 104 Ian Hargreaves, *Digital Opportunity: A Review of Intellectual Property and Growth* (2011).
- 105 Acosta, *supra* note 5.
- 106 *Id.*
- 107 Acosta, *supra* note 5.
- 108 For more on the historical development of knowledge into IP, see Christopher May & Susan K. Sell, *Intellectual Property Rights; A Critical History* (Ipolitics) (2005). *See also* Aurobinda Panda et al., *Intellectual Property Law & Competition Law*, 6 J. Int'l Com. L. & Tech. 120 (2011). It is worth noting that this evolution in IP is still taking shape as we enter deeper into the information age. *See* Assafa Endeshaw, *Reconfiguring Intellectual Property for the Information Age: Towards Information Property?*, Nanyang Business School, Business Law Division Working Paper No. 4/2003 (October 23, 2003).
- 109 *See* Ronan Deazley, *Copyright's Public Domain*, in *Intellectual Property: The Many Faces of the Public Domain*, Elgar (Charlotte Waelde and Hector MacQueen eds., 2007); *See also* John Howkins, *Creativity, Innovation and Intellectual Property: A New Approach for the 21st Century*, in *Intellectual Property: The Many Faces of the Public Domain*, Elgar (Charlotte Waelde and Hector MacQueen eds., 2007).
- 110 Jessica D. Litman, *The Public Domain*, 39 *Emory L.J.* 965, 1024 (1990).
- 111 Robert P. Merges & Glenn Harlan Reynolds, *The Proper Scope of the Copyright and Patent Power*, 37 *Harv. J. on Legis.* 45 (2000). For an economics oriented discussion on the duration of protection for IP, see also Richard A. Posner, *Intellectual Property: The Law and Economics Approach*, 19 *J. Econ. Persp.* 57 (2005).
- 112 *Id.*
- 113 Consider the case of copyright term extensions, where it is not clear if reverting to the public domain entails a negative outcome. *See* Christopher Buccafusco & Paul J. Heald, *Do Bad Things Happen When Works Enter the Public Domain?: Empirical Tests of Copyright Term Extension*, 28 *Berkeley Tech. L.J.*, (2013).
- 114 Robert P. Merges, *A New Dynamism in the Public Domain*, 71 *U. Chi. L. Rev.* 183, (2004).
- 115 Clark D. Asay, *A Case for the Public Domain*, 74 *Ohio St. L.J.* 753 (2013).

- 116 Hugh Breakey, *Natural Intellectual Property Rights and the Public Domain*, 73 Mod. L. Rev. 208, 208 (2010).
- 117 *Id.*
- 118 Julie E. Cohen, *Copyright, Commodification, and Culture: Locating the Public Domain*, in *The Future Of The Public Domain* 121 (L. Guibault & P.B. Hugenholtz, eds. 2006).
- 119 Erickson, *supra* note 99.
- 120 *Id.*
- 121 *Id.*
- 122 *Id.*
- 123 Eli Salzberger, *Economic Analysis of the Public Domain*, in *The Future of the Public Domain* 27-59 (2006), http://papers.ssrn.com/sol3/papers.cfm?abstract_id=934127.
- 124 *Id.*
- 125 Randal C. Picker, *Access and the Public Domain*, U. Chi. Inst. for L. & Econ. Olin Res. Paper No. 631(2013), https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2214176.
- 126 Andrew Beckerman-Rodau, *The Problem with Intellectual Property Rights: Subject Matter Expansion*, 13 Yale J. L. & Techn. 36, 36 (2010), <http://digitalcommons.law.yale.edu/cgi/viewcontent.cgi?article=1064&context=yjolt>.
- 127 Antony Scott Taubman, *The Public Domain and International Intellectual Property Law Treaties*, in *Intellectual Property: The Many Faces of the Public Domain* (Charlotte Waelde & Hector MacQueen, eds. 2007), http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1010527.
- 128 Lawrence Lessig, *Free Culture: How Big Media Uses Technology and the Law to Lock Down Culture and Control Creativity* (2004).
- 129 Erickson *supra* note 99.
- 130 I would add that if Hubots were capable of self-awareness, and even if they were to associate money with power and control, this in and of itself is not a justification for hoarding gains. This would still not be in line with incentives as we understand them to be in the human context and the human oriented IP protection construct. In contrast, in the case of human innovators, literature strongly suggests a correlation between incentives and innovation. For an example, see David Abrams, *Did TRIPS Spur Innovation? An Empirical Analysis of Patent Duration and Incentives to Innovate*, 157 U. Pa. L. Rev. 1613 (2009).
- 131 *Id.*
- 132 For a broad discussion of the exceptions and limitations to IP law, see Andrew F. Christie, *Maximizing Permissible Exceptions to Intellectual Property Rights*, in *The Structure of Intellectual Property Law--Can One Size Fit All?* (Annette Kur & Vytautas Mizaras, eds. 2011), https://papers.ssrn.com/sol3/papers.cfm?abstract_id=1914080; see also Asay *supra* note 115; N. David Palmeter, *The*

U.S. International Trade Commission at Common Law: Unfair Competition, Trademark, and Section 337 of the Tariff Act, 18 J. World Trade L. 497 (1984).

133 Yochai Benkler, *Free As the Air to Common Use: First Amendment Constraints on Enclosure of the Public Domain*, 74 N.Y.U. L. Rev. (May 1999).

134 Dan Bjerg Geary, *Sports Games and Events - At the Intersection between IP and Public Domain*, WIPO Academy, University of Turin and ITC-ILO- Master of Laws in IP Res. Papers Collection 2012-2013 (2013), https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2676322.

135 See Thomas Margoni, *The Protection of Sports Events in the EU: Property, Intellectual Property, Unfair Competition and Special Forms of Protection*, 47 IIC-Int'l Rev. Intell. Prop. & Competition L. 386 (Aug. 29, 2015); see also Marc Edelman, *From Meerkat to Periscope: Does Intellectual Property Law Prohibit the Live Streaming of Commercial Sporting Events*, 39 Colum. J.L. & Arts (2016).

136 Hanoch Dagan, *Property and the Public Domain*, 17 Yale J.L. & Human. 84 (2006).

137 Taubman *supra* note 127.

138 Coombe, *supra* note 98.

139 *Id.* at 1181.

140 Deven R. Desai, *Copyright's Hidden Assumption: A Critical Analysis of the Foundations of Descendible Copyright*, 2011 Wis. L. Rev., 219, 219 (2011).

141 *Id.*

142 Coombe, *supra* note 139, at 1182.

143 Giovanni Battista Ramello, *Private Appropriability and Sharing of Knowledge: Convergence or Contradiction? The Opposite Tragedy of the Creative Commons*, Developments In The Economics Of Copyright (L. Takeyama, W. Gordon, R. Towse, eds., 2005); Michael A. Heller, *The Tragedy of the Anticommons: A Concise Introduction and Lexicon*, 76 Modern L. Rev. 6 (2013); Dan Hunter, *Cyberspace as Place and the Tragedy of the Digital Anticommons*, 91 Cal. L. Rev. 439 (2017).

144 William M. Landes & Richard A. Posner, *An Economic Analysis of Copyright Law*, 18 J. Legal Stud. 325, 326-328 (1989).

145 *Id.* at 332.

146 Erickson *supra* note 99.

147 *Id.*

148 TRIPS: Agreement on Trade-Related Aspects of Intellectual Property Rights, Apr. 15, 1994, Marrakesh Agreement Establishing the World Trade Organization, Annex 1C art. 13, 1867 U.N.T.S. 154.

- 149 *Id.*
- 150 Given the academic nature of this work, I choose not attach any theological reasoning to this debate, and to remain only with physical-scientific reasoning. With that said, there is already literature on the potential clash between robots and faith. *See* Edward Kelley, Interview with A Robot: Searching for God, Religion and Meaning of Life (2013); Anne Foerst, God in the Machine: What Robots Teach Us About Humanity and God (2004).
- 151 Lois L. Shepherd, *In Respect of People Living in a Permanent Vegetative State - And Allowing Them to Die*, Fla. St. U. College of Law Pub. Pol'y Res. Paper No. 153 (2005).
- 152 Frederic Py, What requirements would artificial intelligence have to meet to be considered alive?, Quora (Jun. 17, 2016), <https://www.quora.com/What-requirements-would-artificial-intelligence-have-to-meet-to-be-considered-alive>.
- 153 Arnold De Loof & Jozef Vanden Broeck, *The Key To Defining Life, Death And The Force Driving Evolution-Organic Chemistry-Based-Life Versus Artificial Life-Communication*, 125 Belgian J. Zoology 5 (1995); Carol E. Cleland & Christopher F. Chyba, *Defining "Life,"* 32 Origins of Life and Evolution of the Biosphere 387 (2002).
- 154 *Id.*
- 155 Bobby Azarian, *A neuroscientist explains why artificially intelligent robots will never have consciousness like humans*, Raw Story (Mar. 13, 2016), <http://www.rawstory.com/2016/03/a-neuroscientist-explains-why-artificially-intelligent-robots-will-never-have-consciousness-like-humans/>.
- 156 *Id.*
- 157 Bloomberg, *Tesla's Elon Musk: We're 'Summoning the Demon' with Artificial Intelligence*, YouTube (Nov. 24, 2014), https://www.youtube.com/watch?v=Tzb_CSRO-0g; Elon Musk videos, *Elon Musk compares A.I. efforts to "Summoning the Demon" 2014*, YouTube (Apr. 14, 2015), <https://www.youtube.com/watch?v=JfJjx12wkVQ&t=2569s>; Marvin Harper, *Elon Musk elaborates on his A.I. concerns (2016.9.15)*, YouTube (Jan. 8, 2017), <https://www.youtube.com/watch?v=ycJeht-Mfus&t=832s>.
- 158 *Id.*
- 159 Fox Business, *Bill Gates: I think we do need to worry about artificial intelligence*, YouTube (Jan. 22, 2016), <https://www.youtube.com/watch?v=EmfrMKLwr3k>.
- 160 BBC News, *Stephen Hawking: 'AI could spell end of the human race'*, YouTube (Dec. 2, 2014), <https://www.youtube.com/watch?v=fFLVyWBDTfo>.
- 161 For an example, see Big Think, *Elon Musk and Stephen Hawking Fear a Robot Apocalypse. But a Major Physicist Disagrees.*, YouTube (Jun. 24, 2015), <https://www.youtube.com/watch?v=K5sJA2uBJoo>.
- 162 Nick Bostrom, *Superintelligence: Paths, Dangers, Strategies* 59 (2014).

End of Document

© 2024 Thomson Reuters. No claim to original U.S. Government Works.