

# **Who Owns the Work Product Of Artificial Intelligence Machines?**

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# Who Owns the Work Product of Artificial Intelligence Machines?

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As artificial intelligence (“AI”) advances, your future client seeking a copyright or patent may not be human, but rather a machine.

AI machines have begun creating works and inventions. How should you advise the client as to who owns, or should own, the AI machines’ copyrights or patents? Or, because AI machines are not human, are their works neither copyrightable nor patentable?

The AI machine client will be at your front door or sending you a computer-generated email sooner rather than later given the rapid pace of AI technology development. By 2018, AI will be incorporated into about half of all new apps developed.<sup>2</sup> Annual worldwide software revenue is projected to increase from \$3.2 billion in 2016 to \$89.8 billion by 2025.<sup>3</sup> Last year, China unveiled a plan to create an AI industry worth \$150 billion to its economy by 2030.<sup>4</sup> Today’s AI apps range from Google page translation to Microsoft’s Cortana, Tesla’s autonomous driving features, and predictive maintenance software. Some apps create works such as IBM’s Watson’s cookbook and Google’s Brain Tree, which composes music and art.<sup>5</sup> As the president of the Brookings Institution observed:

From self-driving cars to critical advances in medicine such as CT scan analysis or precision surgery, AI will have the ability to reshape nearly every aspect of our day-to-day lives. On a larger scale, AI and the related technologies it will generate will have the capacity to not only drastically augment any nation-state’s core economic

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<sup>2</sup> John Dodge, Computerworld, Feb. 10, 2016, “Artificial Intelligence in the enterprise: It’s on” <http://www.computerworld.com/article/3030655/emerging-technology/artificial-intelligence-in-the-enterprise-it-s-on.html>

<sup>3</sup> Artificial Intelligence Market Forecasts. <https://www.tractica.com/research/artificial-intelligence-market-forecasts>, November 2017.

<sup>4</sup> Cade Metz, New York Times, Feb. 13, 2018, “China’s Blitz to Dominate A.I.”

<sup>5</sup> <https://magenta.tensorflow.org>.

and security capabilities, but rapidly redistribute the division of power in the world. Woe be unto any nation that falls behind in this race.<sup>6</sup>

AI can be divided into two categories. “Narrow AI” refers to “specific application areas such as playing strategic games, language translation, self-driving vehicles, and image recognition.”<sup>7</sup> Many of the voices heard when interfacing with apps are created by Narrow AI.

The other category is “General AI” (sometimes called “Artificial General Intelligence” or “AGI”), which “refers to a notional future AI system that exhibits apparently intelligent behavior at least as advanced as a person across a full range of cognitive tasks.”<sup>8</sup> This form of AI meets the test proposed in 1950 by Alan Turing to determine if AI is “human.” Under his test, participants would converse with the machine in a text-only format. The participants would then indicate if they believed they were dealing with a human or a machine. Turing declared that, if the responses were indistinguishable from a real human’s response, the machine would appear human.<sup>9</sup> Today many of the interactions online are with some form of General AI. While these interactions have the feel of human interaction, most users understand they are dealing with computers rather than humans.

The next level of AI is to increase the computer’s learning ability and intelligence. If computer “learning” continues at its present pace, computer scientists believe computers will first equal, then surpass, human intelligence. “[A] survey of AI researchers found that 80 percent of respondents believed that human-level General AI will eventually be achieved, and half believed it is at least 50 percent likely to be achieved by the year 2040. Most respondents also believed that

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<sup>6</sup> John R Allen, Brookings Institute, “Trump’s 1<sup>st</sup> State of the Union: Artificial intelligence and the future of America,” <https://www.brookings.edu/blog/fixgov/2018/01/30/trumps-1st-sotu-artificial-intelligence-and-the-future-of-america>, January 30, 2018.

<sup>7</sup> “Preparing for the Future of Artificial Intelligence,” Executive Office of the President, National Science and Technology Council Committee on Technology, October 2016 at P 7.

<sup>8</sup> *Id.*

<sup>9</sup> Raquel Acosta, “Artificial Intelligence and Authorship Rights, Jolt Digest, February, 2012, <http://jolt.law.harvard.edu/digest/copyright/artificial-intelligence-and-authorship-rights>.

General AI will eventually surpass humans in general intelligence.”<sup>10</sup> Others believe it could come much sooner.

General AI includes the ability of a computer to learn by looking at data sets, form meaningful correlations among that data, and respond to stimuli in such ways as to demonstrate the usefulness of those correlations; *i.e.*, they read, they learn, and they respond to queries in useful ways from what they learned.

Artificial general intelligence will not involve dutiful adherence to explicit instructions, but instead will demonstrate a facility with the implicit, the interpretive. It will be a general tool, designed for general purposes in a general context.<sup>11</sup>

Google Brain was founded on the principle “that artificial ‘neural networks’ that acquaint themselves with the world via trial and error, as toddlers do, might in turn develop something like human flexibility.”<sup>12</sup>

This is different than producing or writing code in the traditional sense. AI machines create works that the law traditionally treats as intellectual property, interact with other AI machines and humans, and ultimately reproduce themselves. As a draft European resolution explains:

Thanks to the impressive technological advances of the last decade, not only are today’s robots able to perform activities which used to be typically and exclusively human, but the development of autonomous and cognitive features—e.g. the ability to learn from experience and make independent decisions—has made them more and more similar to agents that interact with their environment and are able to alter it significantly.<sup>13</sup>

The report warns that “ultimately there is a possibility that within the space of a few decades AI could surpass human intellectual capacity in a manner which, if not prepared for, could

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<sup>10</sup> *Id.* at 23.

<sup>11</sup> Gideon Lewis-Kraus, “Going Neural,” *New York Times Magazine*, December 18, 2016.

<sup>12</sup> *Id.*

<sup>13</sup> European Parliament Resolution with recommendations on Civil Law Rules on Robotics (2015/2103 (INL)), available at <http://www.europarl.europa.eu/sides/getDoc.do?pubRef=-//EP//NONSGML%2BCOMPARL%2BPE-582.443%2B01%2BDOC%2BPDF%2BV0//EN>.

pose a challenge to humanity's capacity to control its own creation and, consequently, perhaps also to its capacity to be in charge of its own destiny and to ensure the survival of the species."<sup>14</sup> Stephen Hawking wrote that "Success in creating AI would be the biggest event in human history. Unfortunately, it might be the last, unless we learn how to avoid the risks. In the near term, world militaries are considering autonomous-weapon systems that can choose and eliminate targets." Because humans are "limited by slow biological evolution," they cannot compete "and would be superseded by AI."<sup>15</sup>

In the United States, President Obama's Office issued a report designed to prepare "the United States for a future in which Artificial Intelligence (AI) plays a growing role," but the report stops short of making any recommendations. Rather, the report prefers monitoring worldwide developments "to get early warning of important changes elsewhere in case these require changes in U.S. policy."<sup>16</sup> In President Trump's first State of the Union speech, the ball on AI was not advanced. Brookings Institution President Allen noted that what was "missing from this speech is the clarion call to develop the full potential of artificial intelligence and to pursue all measures possible to preserve what I fear will be America's fleeting performance in this field."<sup>17</sup>

The U.S. generally treats AI under existing law, although there are some limited laws applicable to certain applications such as autonomous vehicles, which are more in the form of when and where autonomous vehicles may be driven.

The U.S. Constitution gives Congress the power to "promote the Progress of Science and useful Arts, by securing for limited Times to Authors and Inventors the exclusive Right to their

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<sup>14</sup> *Id.*

<sup>15</sup> Michael Sainato, "Stephen Hawking, Elon Musk, and Bill Gates Warn About Artificial Intelligence," August 13, 2015. <http://observer.com/2015/08/stephen-hawking-elon-musk-and-bill-gates-warn-about-artificial-intelligence>.

<sup>16</sup> Preparing for the Future, *Ibid.*

<sup>17</sup> "Trump's 1<sup>st</sup> State of the Union: Artificial intelligence and the future of America," *Ibid.*

respective Writings and Discoveries.” Art. 1, Sec. 8. Computers generating works or inventions also advance the progress of science and useful arts. However, a computer, no matter how “smart,” is not motivated by being granted an exclusive right to an invention or a royalty for a work, which are the rewards current copyright and patent laws provide. Monetary or monopolistic awards are distinctively human. Moreover, current laws would not allow a computer to be an inventor of a patentable invention or the author of a copyrightable work because they are not human.<sup>18</sup>

***An AI computer may not be an inventor under U.S. patent law.***

Under current patent law the “term ‘inventor’ means the individual or, if a joint invention, the individuals collectively who invented or discovered the subject matter of the invention.” 35 U.S.C. § 100(f). “Conception” is the “touchstone of inventorship.” *Ethicon, Inc. v. U.S. Surgical Corp.*, 135 F.3d 1456, 1460 (Fed. Cir. 1998). “Conception is the ‘formation in the mind of the inventor, of a definite and permanent idea of the complete and operative invention, as it is hereafter to be applied in practice.’” *Hybritech, Inc. v. Monoclonal Antibodies, Inc.*, 802 F.2d 1367, 1376, 231 USPQ 81, 87 (Fed.Cir.1986) (quoting 1 *Robinson on Patents* 532 (1890)).” *Id.*

The USPTO Manual of Patent Examining Procedure, 2137.1(II) explains inventorship as:

The definition for inventorship can be simply stated: “The threshold question in determining inventorship is who conceived the invention. Unless a person contributes to the conception of the invention, he is not an inventor. . . . One must contribute to the conception to be an inventor.” *In re Hardee*, 223 USPQ 1122, 1123 (Comm’r Pat. 1984). See also *Board of Education ex rel. Board of Trustees of Florida State Univ. v. American Bioscience Inc.*, 333 F.3d 1330, 1340, 67 USPQ2d 1252, 1259 (Fed. Cir. 2003) (“Invention requires conception”); *Ex parte Smernoff*, 215 USPQ 545, 547 (Bd. App. 1982) (“one who suggests an idea of a result to be accomplished, rather than the means of accomplishing it, is not an coinventor”). See MPEP § 2138.04 - § 2138.05 for a discussion of what evidence is required to establish conception or reduction to practice.

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<sup>18</sup> Interestingly, Saudi Arabia granted humanoid robot Sophia citizenship. Of course, “citizenship” doesn’t mean being declared a human. “Saudi Arabia Is First Country In The World to Grant A Robot Citizenship,” October 25, 2017, Center for International Communications, <https://cic.org.sa/2017/10/saudi-arabia-is-first-country-in-the-world-to-grant-a-robot-citizenship>.

An AI computer cannot “conceive” an invention as the law is currently interpreted. In addition, if an AI computer is conducting a task originally conceived by a human, the human giving limited instructions to the AI computer could not claim to be the inventor of any resulting invention. One who simply provides another with well-known principles or explains the state of the art without ever having “a firm and definite idea” of the claimed combination as a whole does not qualify as an inventor—joint or otherwise.<sup>19</sup> Merely providing the initial data to an AI computer is not enough to make the human an inventor, yet U.S. law requires a human being to be the inventor. If there is no human inventor, then the invention may not be patentable because it lacks the statutory human inventor. This leads to the odd result that, if a human created an invention, a patent would issue, but if an AI machine created the same invention, then no patent could issue.

In a patent application, the inventor “must execute an oath or declaration directed to the application.”<sup>20</sup> An AI computer cannot execute an oath or declaration to meet this requirement (ignoring the fact that it could generate a form saying it did). With no declaration, the U.S. Patent Office will reject the application as failing to meet its rules. Of course, the law and the rules could be changed to allow a human to obtain the patent on an invention created by a computer. While this may sound simple, it begs the question as to which human should be the inventor. There likely are multiple humans connected with an AI machine, unless the AI computer was generated by another AI machine. The person who initially programmed the computer could be the inventor, or the inventor could be the person who designed the hardware for the computer. It could be the person who selected the area in which the computer was conducting research. In most cases, no one individual, or team of individuals, does all of the work. The flaw in substituting a human for

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<sup>19</sup> *Ethicon*, 135 F.3d at 1460.

<sup>20</sup> Manual of Patent Examining Procedure 2137.1 (I).

the AI machine in these scenarios is the fact that the AI machine “learns” from the data provided and produces its own results, such as a potential invention. Thus, the initial programmer or the hardware designer provides only a fraction of the process that probably is insufficient to give the humans any rights in an invention created by the AI machine. Assuming there is an agreement as to who could claim the patent, maybe a truly intelligent AI machine would not accept the results and would refuse to work without being awarded the patent. These scenarios do not address the invention created by an AI machine that independently develops a patentable invention and created the patentable item using 3-D printing after talking with other AI machines connected together via the internet of things.

*Can an AI machine directly or indirectly infringe a patent?*

A U.S. patent is infringed by “whoever without authority makes, uses, offers to sell, or sells any patented invention within the United States or imports into the United States any patented invention.” 35 U.S. Code § 271(a). “Under this form of liability, a defendant's mental state is irrelevant. Direct infringement is a strict-liability offense. *Global-Tech*, 563 U.S., at —, 131 S.Ct., at 2065–2066, n. 2.” *Commil USA, LLC v. Cisco Sys., Inc.*, 135 S. Ct. 1920, 1926, 191 L. Ed. 2d 883 (2015). Because direct infringement does not require any mental state, an AI machine could infringe on a patent but only if the term “whoever” includes non-persons. However, as discussed above, if an AI machine is not a person for purposes of obtaining a patent, it could be argued using similar logic that an AI machine cannot directly infringe on a patent.

On the other hand, induced infringement requires knowledge, making it more unlikely that an AI machine could be an indirect infringer. An indirect infringer is “whoever actively induces infringement of a patent.” § 271 at (b). “[I]nduced infringement under § 271(b) requires knowledge

that the induced acts constitute patent infringement.” *Glob.-Tech Appliances, Inc. v. SEB S.A.*, 563 U.S. 754, 766, 131 S. Ct. 2060, 2068, 179 L. Ed. 2d 1167 (2011).

The knowledge requirement can be met by a showing of either actual knowledge or willful blindness. *See id.* “[A] willfully blind defendant is one who takes deliberate actions to avoid confirming a high probability of wrongdoing and who can almost be said to have actually known the critical facts.” *Id.* at 2070–71. “[I]nducement requires evidence of culpable conduct, directed to encouraging another’s infringement, not merely that the inducer had knowledge of the direct infringer’s activities.” *DSU Medical Corp. v. JMS Co., Ltd.*, 471 F.3d 1293, 1306 (Fed.Cir.2006) (en banc in relevant part) (citations omitted).

*Courtesy Prod., L.L.C. v. Hamilton Beach Brands, Inc.*, 73 F. Supp. 3d 435, 440 (D. Del. 2014)

Because an AI machine would lack “knowledge” of an existing patent, it could not be an indirect infringer. Of course, it is possible under the willful blindness test that the entity that initially created the AI machine could be liable if it intentionally omitted data that would have provided “knowledge” to the machine.

### ***Can an AI machine block a patent?***

Under the current U.S. patent system, to qualify as a patent an invention must be in a category that is patentable, novel, useful, and non-obvious. 35 U.S.C. §101. Meeting these requirements requires searching prior art. As the statute notes:

NOVELTY; PRIOR ART—A person shall be entitled to a patent unless—  
(1) the claimed invention was patented, described in a printed publication, or in public use, on sale, or otherwise available to the public before the effective filing date of the claimed invention;

35 U.S.C. § 102.

There are several groups that are attempting to “democratize ideas” by publishing on the internet AI machine-generated patent claims. One such group, All Prior Art, explains that it

is a project attempting to algorithmically create and publicly publish all possible new prior art, thereby making the published concepts not patentable. The concept is to democratize ideas, provide an impetus for change in the patent system, and to preempt patent trolls. The system works by pulling text from the entire database of

US issued and published (unapproved) patents and creating prior art from the patent language.<sup>21</sup>

All Prior Art admits that many of its AI machine-generated patent claims are nonsensical, such as:

Multi-touch touch-sensing devices and methods are described herein. The machine is a direction-finding, wheeled, transportable vehicle, which is a self-regulating, repair machine, controlled by a complex central computer. An actuator is at least partially disposed within the tubular housing and couples the motor to the tubular housing.<sup>22</sup>

There have been no reported cases where a patent has been blocked by AI machine generated “prior art” published on the internet.

***An AI machine may not be an ‘author’ under U.S. copyright law.***

An application for a copyright by an AI computer also will fail under existing U.S. law. “The U.S. Copyright Office will register an original work of authorship, provided that the work was created by a human being.”<sup>23</sup> The Copyright Office Compendium finds that “copyright law is limited to original intellectual conceptions of the author” and the “Office will refuse to register a claim if it determines that a human being did not create the work.”<sup>24</sup> In explaining this rule, the Copyright Office states it “will not register works produced by a machine or mere mechanical process that operates randomly or automatically without any creative input or intervention from a human author.”<sup>25</sup> “The Compendium states that, “[t]o qualify as a work of ‘authorship’ a work must be created by a human being. Works that do not satisfy this requirement are not copyrightable.” *Naruto v. Slater*, No. 15-CV-04324-WHO, 2016 WL 362231, at \*4 (N.D. Cal. Jan. 28, 2016) (finding that monkey could not register a copyright of its selfie because it was not

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<sup>21</sup> <http://allpriorart.com/about/>

<sup>22</sup> <http://allpriorart.com/page/2/>

<sup>23</sup> Compendium of the U.S. Copyright Office Practices, Third Edition, Section 306.

<sup>24</sup> *Id.*

<sup>25</sup> Compendium of the U.S. Copyright Office Practices, Third Edition, Section 313.2.

a human being). Therefore, works created by an AI machine likewise are not copyrightable at present.

### ***What are other countries doing?***

The European Union in a report found “there are no legal provisions that specifically apply to robotics.” While the term “robots” may be too limiting, the report does highlight some issues concerning AI and proposes a modest framework to address some of the issues. The report calls for the creation of a European Agency for robots and AI that would prepare a common definition of AI, consider registering advanced robots, and set guidelines. The report recommends that the EU establish “a balanced approach to intellectual property rights when applied to hardware and software standards, and codes that protect innovation and at the same time foster innovation.” The report also calls on the EU “to elaborate criteria for an ‘own intellectual creation’ for copyrightable works produced by computers or robots.”<sup>26</sup>

In Japan, a copyright protects only “works that creatively express thoughts or emotion,” which has been interpreted to apply only to humans.<sup>27</sup> Japan has proposed protecting an AI-created work using an “unfair competition” regime, not copyright law. “The person or company responsible for a technological system that produces creative work would be granted rights to the results. Rights holders would be allowed to seek injunctions against or damages for unauthorized use letting them more easily recover investment costs.”<sup>28</sup> This approach was recommended out of concern that AI could produce billions of pieces of copyrighted content. Kensaku Fukui, a copyright lawyer who helped develop the Japanese proposal, notes, “[i]f we gave copyrights to all

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<sup>26</sup> European Parliament Resolution, *Ibid.*

<sup>27</sup><http://www.japantimes.co.jp/news/2016/06/19/national/science-health/japanese-researchers-take-artificial-intelligence-toward-the-final-frontier-creativity>

<sup>28</sup> Nikkei Asian Review, “Japan eyes rights protection for AI artwork”, April 15, 2016, <http://asia.nikkei.com/Politics-Economy/Economy/Japan-eyes-rights-protection-for-AI-artwork>

of them, it would bar people from creating similar works, potentially threatening the human exercise of creativity, and hand these platforms an automatic monopoly on content.”<sup>29</sup>

The United Kingdom copyright law defines, “[i]n the case of a literary, dramatic, musical or artistic work which is computer-generated, the author shall be taken to be the person by whom the arrangements necessary for the creation of the work are undertaken.”<sup>30</sup> Arguably, if the AI machine was originally programmed or given data from a human, then the human would be the author.

For example, United Kingdom-based Jukedeck.com<sup>31</sup> produces AI-generated music for its customers, who may either use the AI music for their own use or obtain a license to the copyright of the music. The terms provide that when “you purchase a Track under the Copyright license, Jukedeck transfers ownership of the track to you. Thereafter, you can do what you wish with the track.”<sup>32</sup>

Generally, under the Berne Convention, copyrights issued in convention signatory countries are enforced in other member countries, subject to the country’s own laws. As discussed above, U.S. copyright law requires a human author. Can this U.S. requirement be avoided by registering an AI work in the UK and then enforcing it in the United States via the Berne Convention? No. Sec. 104 limits Berne Convention protection as follows:

No right or interest in a work eligible for protection under this title may be claimed by virtue of, or in reliance upon, the provisions of the Berne Convention, or the adherence of the United States thereto. Any rights in a work eligible for protection under this title that derive from this title, other Federal or State statutes, or the common law, shall not be expanded or reduced by virtue of, or in reliance upon,

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<sup>29</sup> “Japanese researches take artificial intelligence toward the final frontier: creativity.” Japan Times, June 19, 2016 <http://www.japantimes.co.jp/news/2016/06/19/national/science-health/japanese-researchers-take-artificial-intelligence-toward-the-final-frontier-creativity>

<sup>30</sup> Copyright, Design and Patent Act 1988, Ch. 48 § 9(3).

<sup>31</sup> <https://www.jukedeck.com>.

<sup>32</sup> <https://www.jukedeck.com/licensing>.

the provisions of the Berne Convention, or the adherence of the United States thereto.<sup>33</sup>

Therefore, international law does not assist U.S.-based AI machines in obtaining copyright protection.

### ***Conclusion***

While the United States continues to study AI machines and technologies, other countries already have taken some small steps to address the technology. Businesses must remain alert to legislative actions. In the meantime, the best protection may be for businesses to develop contracts that address ownership of AI-machine generated works, at least as it pertains to cooperation among businesses.

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<sup>33</sup> 17 U.S.C. § 104(c).