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Rise of the Machines: The Future of Intellectual Property Rights in the Age of Artificial Intelligence

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Rise of the Machines

THE FUTURE OF INTELLECTUAL PROPERTY RIGHTS IN THE AGE OF ARTIFICIAL INTELLIGENCE

"*We are both created and create. Why cannot our own creations also create?*"[1]

INTRODUCTION

On April 24, 2023, the Supreme Court of the United States refused to join several courts around the globe in weighing in on the controversial debate on intellectual property (IP) and artificial intelligence (AI).[2] With a swift decision, the Court declined to answer whether an AI machine could fall within the statutory definition of "inventor" under the Patent Act and thus, whether AI-generated inventions could receive patent protection.[3] The decision put an end to one scientist's battle against the United States Patent and Trademark Office (USPTO) to obtain inventorship recognition for his AI machine.[4] However, while the fight in the United States may have reached a stalling point, the war over AI-generated outputs is far from over.

Over the past five decades, Dr. Stephen Thaler, President & CEO of technology company Imagination Engines, Inc., has galvanized the scientific world with his discoveries and innovations in the field of AI.[5] However, it was not until the late

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[1] *Thaler v Comm'r of Pat.* [2021] FCA 879 (30 July 2021) 3 (Austl.).

[2] Thaler v. Vidal, 143 S. Ct. 1783 (2023).

[3] *See* Petition for Writ of Certiorari at 1–3, Thaler v. Vidal, 143 S. Ct. 1783 (2023) (No. 22-919). In an attempt to persuade the Court to grant certiorari, this author led a group of students from the Brooklyn Law Incubator & Policy Clinic at Brooklyn Law School to file an amicus brief in the Supreme Court highlighting the need for further judicial review on the issue. *See generally* Brief for Brooklyn Law Incubator & Policy (BLIP) Clinic and Prof. Dr. Peter Georg Picht as Amici Curiae Supporting Petitioner, Thaler v. Vidal, 143 S. Ct. 1783 (2023) (No. 22-919) (explaining the negative implications of the Federal Circuit's decision).

[4] *See generally* Thaler v. Vidal, 43 F.4th 1207, 1209–10 (Fed. Cir. 2022) (explaining what prompted the lawsuit).

[5] *See Stephen L. Thaler, Ph.D.*, IMAGINATION ENGINES INC., https://www.imagination-engines.com/founder.html [https://perma.cc/RL7P-PKRV]; Bob Holmes, *The Creativity Machine*, NEWSCIENTIST (Jan. 20, 1996), https://www.

2010s that his name, along with the name of his most advanced creation—DABUS[6]—became known in the legal world as well. Prior to entering the legal spotlight, DABUS was an extremely sophisticated AI system "studying how consciousness and sentience may arise within machine intelligence."[7] Within the AI field, a field that focuses on solving problems by employing computer science and vast datasets, Dr. Thaler's machine occupies a subfield called generative AI, which is a type of deep learning system that relies on raw data to "generate statistically probable [and novel] outputs when prompted."[8] The novelty of DABUS is its focus on sentience and autonomy.[9]

In 2018, DABUS became the "face" of the fight for the legal recognition of AI's role in the creation of IP. After the machine autonomously generated novel artwork, Dr. Thaler and his legal team, led by attorney Ryan Abbott,[10] sought to obtain copyright protection with the US Copyright Office (USCO).[11] In the application, the scientist listed the AI machine as the author of the work and specified that DABUS had "autonomously created" it.[12] The USCO denied his application because it failed

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newscientist.com/article/mg14920134-000-the-creativity-machine/ [https://perma.cc/L3NY-5LX3].

[6] DABUS stands for "Device for the Autonomous Bootstrapping of Unified Sentience." Stephen Thaler, *DABUS Explained to the AIPLA*, LINKEDIN (May 22, 2022), https://www.linkedin.com/pulse/dabus-explained-aipla-dr-stephen-thaler/ [https://perma.cc/8DDH-ULG7].

[7] Stephen Thaler, *DABUS FAQ*, LINKEDIN (Jan. 15, 2023), https://www.linkedin.com/pulse/dabus-faq-dr-stephen-thaler/?trackingId=iIFXl88MQK6XtxrT0ANSVQ%3D%3D [https://perma.cc/KS5F-LJJW].

[8] *What Is Artificial Intelligence (AI)?*, IBM, https://www.ibm.com/topics/artificial-intelligence [https://perma.cc/TSK5-9G7R].

[9] *See generally The Recent Leap from Conscious to Sentient Machines*, IMAGINATION ENGINES INC., https://imagination-engines.com/index.html [https://perma.cc/LUC5-PSYK] (explaining how DABUS achieved sentience).

[10] *See generally About*, RYAN ABBOTT, https://ryanabbott.com/about/ [https://perma.cc/UG5S-HEUX] ("Ryan Abbott, MD, JD, MTOM, PhD is Professor of Law and Health Sciences at the University of Surrey School of Law."). Professor Abbott is one of the most influential attorneys in IP and has authored several articles and books on the intersection of AI and the law. *See Ryan Abbott*, BROWN NERI SMITH & KHAN, LLP, https://bnsklaw.com/attorneys/ryan-abbott [https://perma.cc/7CEA-Y32W].

[11] Maya Medeiros, David Yi, & William Chalmers, *IP Monitor: Copyright Protection for AI-Created Work?*, NORTON ROSE FULBRIGHT (Mar. 2022), https://www.nortonrosefulbright.com/en/knowledge/publications/68947aaf/copyright-protection-for-ai-created-work [https://perma.cc/7VV6-6GUD]; *see also* Joel Feldman, *The Art of Artificial Intelligence: A Recent Copyright Law Development*, REUTERS (Apr. 22, 2022), https://www.reuters.com/legal/legalindustry/art-artificial-intelligence-recent-copyright-law-development-2022-04-22 [https://perma.cc/ABQ4-SY9A].

[12] Allison M. Lucier, *Questions Surround AI-Generated Art and Copyright Authorship: If You Can't Tell the Difference, What Does It Matter?*, HOLLAND & KNIGHT IP/DECODE BLOG (July 26, 2022), https://www.hklaw.com/en/insights/publications/2022/07/questions-surround-ai-generated-art-and-copyright-authorship [https://perma.cc/P59T-UXZS].

to identify a human author.[13] The same year, Dr. Thaler and his team also sought to obtain patents with the USPTO for two inventions conceived by DABUS.[14] Like in his copyright application, the scientist maintained that "DABUS had autonomously generated the invention[s] and 'identified the novelty of its own idea[s] before a natural person did.'"[15] The USPTO deemed the applications incomplete because they failed to identify a valid inventor.[16] When Dr. Thaler refused to amend them, the USPTO denied the applications, arguing that the Patent Act expressly required inventors to be human.[17]

The United States is not the only jurisdiction targeted by Dr. Thaler and his team. In their quest to push the boundaries of IP law and to start a conversation on its shortcomings with respect to AI capabilities, Dr. Thaler's team has filed patent applications in eighteen countries across the world, including Australia, Germany, and the United Kingdom.[18] While several applications remain pending, a few countries have already expressed their views on the viability of the claim of DABUS as an inventor.[19]

Dr. Thaler scored a historic victory in South Africa in 2021, where the Companies and Intellectual Property Commission (CIPC) granted his patent applications listing

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[13] *See* Letter from Copyright Review Board to Ryan Abbott, (Feb. 14, 2022), https://www.copyright.gov/rulings-filings/review-board/docs/a-recent-entrance-to-paradise.pdf [https://perma.cc/VP2H-PMHH] (explaining that "copyright law only protects 'the fruits of intellectual labor' that 'are founded in the creative powers of the [human] mind'" (quoting U.S. COPYRIGHT OFF., COMPENDIUM OF U.S. COPYRIGHT OFFICE PRACTICE § 602.4(C) (3d ed. 2021))).

[14] Briana Hopes, *Rights for Robots? U.S. Courts and Patent Offices Must Consider Recognizing Artificial Intelligence Systems as Patent Inventors*, 23 TUL. J. TECH. & INTELL. PROP. 119, 120 (2021) (explaining that DABUS's inventions consist of a food container and a light beacon).

[15] Tzipi Zipper, *Mind Over Matter: Addressing Challenges of Computer-Generated Works Under Copyright Law*, 22 WAKE FOREST J. BUS. & INTELL. PROP. L. 129, 133 (2022).

[16] Thaler v. Hirshfeld, 558 F. Supp. 3d 238, 242 (E.D. Va. 2021).

[17] *See* Thaler, 2020 Dec. Comm'r Pat. 1–8; 35 U.S.C. § 100(f) ("The term 'inventor' means the individual . . . who invented or discovered the subject matter of the invention.").

[18] Dr. Thaler and his team have filed applications in Australia, Brazil, Canada, China, Europe, Germany, India, Israel, Japan, New Zealand, the Republic of Korea, Saudi Arabia, Singapore, South Africa, Switzerland, Taiwan, the United Kingdom, and the United States. *Patents and Applications*, ARTIFICIAL INVENTOR PROJECT, https://artificialinventor.com/patent-applications/ [https://perma.cc/KLW2-YHKA]. In this context, this article refers to Europe as a country because patentees can apply for EU-wide patents on top of applying for patents in each individual EU nation. *See Patent Protection in the EU*, EUR. COMM'N, https://single-market-economy.ec.europa.eu/industry/strategy/intellectual-property/patent-protection-eu_en [https://perma.cc/L236-KV5X].

[19] *See Patents and Applications*, *supra* note 18.

DABUS as the inventor.[20] Unfortunately, however, the victory lap was short-lived, as no other IP Office sided with the scientist and his machine.[21] In Australia, the Australian Patent Office (APO) declared that allowing an AI machine to be the inventor of a patent was inconsistent with the Patent Act.[22] Similarly, the UK Intellectual Property Office (UK IPO) argued that having an AI machine listed as the inventor did not meet the formal requirements for a patent application.[23]

The refusal by both domestic and foreign IP Offices to recognize DABUS as the author and inventor of its work was met swiftly with a wave of litigation across the globe.[24] While most lawsuits have ended in defeat, Dr. Thaler—with DABUS—made history once again in 2021, this time in Australia.[25] In a landmark decision, the Federal Court of Australia became "the first court in the world" to recognize an AI machine "as the inventor of a patent."[26] Although the decision was later overturned by the Full Court of the Federal Court of Australia,[27] the significance of the initial judicial victory did not go unnoticed by AI and IP scholars alike.[28]

With his applications and subsequent lawsuits, Dr. Thaler and his legal team are attempting to bring awareness to the need

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[20] Zipper, *supra* note 15, at 133 (noting that South Africa is "the first country in the world to issue a patent attributed" to an AI machine); *see also* Cos. & Intell. Prop. Comm'n, *Food Container and Devices and Methods for Attracting Enhanced Attention*, 54 PAT. J 1, 255 (2021).

[21] For a list of countries where applications or appeals are still pending and countries where they were denied, see *Patents and Applications*, *supra* note 18.

[22] *See* Stephen L. Thaler [2021] APO 5; 162 IPR 381 (Austl.).

[23] U.K. INTELL. PROP. OFF., DECISION BL O/741/19 (Dec. 4, 2019), ¶ 20, https://www.ipo.gov.uk/p-challenge-decision-results/o74119.pdf [https://perma.cc/XBC2-FVJW] (explaining that Section 7 and 13 of the Patent Act require an inventor to be "a natural person" and that DABUS could not qualify as one).

[24] *See Patents and Applications*, *supra* note 18; *see generally* Complaint, Thaler v. Perlmutter, No. 1:22-cv-01564 (D.D.C. June 2, 2022), ECF No. 1.

[25] *See Patents and Applications*, *supra* note 18; *Thaler v Comm'r of Pat* [2021] FCA 879 (30 July 2021) 1–3 (Austl.).

[26] Zipper, *supra* note 15, at 133.

[27] *Comm'r of Patents v Thaler* [2022] FCAFC 62 (13 Apr. 2022) 32 (Austl.). The Full Court is the appellate division of the Federal Court of Australia and is comprised of three judges. *See* Fernanda Dahlstrom, *The Federal Court of Australia*, ARMSTRONG LEGAL, https://www.armstronglegal.com.au/administrative-law/national/court-processes/federal-court-of-australia/ [https://perma.cc/LLP5-CNWA].

[28] *See* Grant Shoebridge, *The DABUS Decision Makes Australia Look Like a Champion of Innovation, Not a Chump*, IAM MEDIA (Sept. 11, 2021), https://www.iam-media.com/article/the-dabus-decision-makes-australia-look-champion-of-innovation-not-chump [https://perma.cc/Y6A9-FQJZ]; Alexandra Jones, *Artificial Intelligence Can Now Be Recognized as an Inventor After Historic Australian Court Decision*, ABC (July 31, 2021, 3:13 PM), https://www.abc.net.au/news/2021-08-01/historic-decision-allows-ai-to-be-recognised-as-an-inventor/100339264?utm_campaign=abc_news_web&utm_content=link&utm_medium=content_shared&utm_source=abc_news_web [https://perma.cc/Y2CC-GA7W].

for IP laws to keep up with technology.[29] In the United States, most laws governing IP stem from the "Patent and Copyright Clause" of the US Constitution, which authorizes Congress "[t]o promote the [p]rogress of [s]cience and useful [a]rts, by securing for limited [t]imes to [a]uthors and [i]nventors the exclusive [r]ight to their respective [w]ritings and [d]iscoveries."[30] Yet, how can Congress "promote the [p]rogress of [s]cience and useful [a]rts"[31] when it refuses to acknowledge the need to modernize IP law to account for the advancement of technology?[32]

The importance of the current debate on IP and AI rests on the critical effects a well-developed, comprehensive, national AI strategy can have on a country.[33] While allowing DABUS to be an author or inventor might seem trivial, such a decision would ultimately improve the safety, well-being, and economic prosperity of the United States and bolster the progress of AI technology. However, under current IP law, the United States fails to provide strong incentives for "businesses to invest in developing inventive AI systems."[34] To stay ahead of the curve, the United States should act now and pioneer a new IP framework to advance AI technology and reap its far-reaching benefits before the rest of the world beats it to the punch.

Ultimately, this note argues that Congress should develop a new "type" of IP, hereinafter called Digiwork, as a subcategory of patents and copyrights available exclusively to AI-generated IP. The owner of an AI machine that produced a creative work or invention, or alternatively the person who commissioned the work, would automatically qualify as the owner of a Digiwork copyright or Digiwork patent. As such, they would have "the exclusive right to prevent or stop others from commercially

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[29] Riddhi Setty, *Artificial Intelligence Can Be Copyright Author, Suit Says (1)*, BLOOMBERG L. (June 3, 2022, 12:10 PM), https://news.bloomberglaw.com/ip-law/artificial-intelligence-can-be-copyright-author-lawsuit-alleges [https://perma.cc/E424-S2K3] ("[T]hese cases are legal test cases that are designed to help enhance the discussion about what to do now that we have artificial intelligence stepping into the shoes of people and doing human sorts of things.").

[30] U.S. CONST. art. I, § 8, cl. 8.

[31] *Id.*

[32] Ryan Abbott, *Artificial Intelligence and Intellectual Property: An Introduction*, *in* RESEARCH HANDBOOK ON INTELLECTUAL PROPERTY AND ARTIFICIAL INTELLIGENCE 1, 17 (Ryan Abbott ed., 2022).

[33] AI strategy refers to a country's approach to the advancement and implementation of AI technology "to gain an advantage over the competition." *See* Naveen Joshi, *Why Countries Need a National AI Strategy*, ALLERIN (Apr. 14, 2021), https://www.allerin.com/blog/why-countries-need-a-national-ai-strategy [https://perma.cc/U2TK-FZYX] (explaining the reasons why "the country with the most effective national AI strategy will reign supreme").

[34] Thomas Macaulay, *Why AI Systems Should Be Recognized as Inventors*, NEXT WEB (Feb. 17, 2020, 9:41 PM), https://thenextweb.com/news/why-ai-systems-should-be-recognized-as-inventors [https://perma.cc/RV2C-UE6X].

exploiting" the protected product for a period of time.[35] Notably, Digiwork rights would replace the human authorship or inventorship requirement with an AI-*source* requirement.

This note proceeds in four parts. Part I provides a broad overview of the evolution of AI machines, with attention given to the unique nature and abilities of DABUS, and highlights how AI has contributed to society within and outside of the IP realm. Part II reviews current IP laws in the United States, specifically the Copyright Act and Patent Act. Part III focuses on DABUS as a test case and discusses how courts in the United States and abroad have approached the emerging trend of AI-generated works. Lastly, Part IV proposes the Digiwork framework as the solution to the issues raised by AI-generated creative works and inventions and compares Digiworks' features and implications to other approaches that legal scholars have proposed.

I. ARTIFICIAL INTELLIGENCE AND THE BIRTH OF DABUS

Artificial intelligence refers to "the science and engineering of making intelligent machines."[36] Thanks to the combination of human-like intelligence and computer science, AI machines are able to quickly process enormous amounts of data—far more than the human brain—and make complex judgments to produce optimal outputs.[37] The purpose of AI is to produce advanced technology capable of assisting people by expanding human ability to solve problems, develop ideas, and generate realizable value.[38] Ultimately, when allowed to flourish, AI technology purports to heighten people's artistic and scientific abilities by giving them access to augmented intelligence beyond the limits of human intellect.[39]

A. The Birth and Rise of Artificial Intelligence

Despite being considered a relatively new technology, artificial intelligence has been in the works for almost a century.

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[35] *Patents*, WIPO, https://www.wipo.int/patents/en [https://perma.cc/3KT6-7SAD].

[36] John McCarthy, *What Is Artificial Intelligence?*, COMP. SCI. DEP'T, STAN. UNIV. (Nov. 12, 2007), http://jmc.stanford.edu/articles/whatisai/whatisai.pdf [https://perma.cc/KE6K-TUQH].

[37] *See* Eray Eliaçık, *Artificial Intelligence vs. Human Intelligence: Can a Game-Changing Technology Play the Game?*, DATACONOMY (Apr. 20, 2022), https://dataconomy.com/2022/04/20/is-artificial-intelligence-better-than-human-intelligence/ [https://perma.cc/JFW3-WURU].

[38] Yingwu Gao, *The Purpose of Intelligence in AI and the Role It Plays*, LINKEDIN (Jan. 8, 2020), https://www.linkedin.com/pulse/purpose-intelligence-ai-role-plays-yingwu-gao/ [https://perma.cc/QYH3-G72B].

[39] *Id.*

In the 1930s, English mathematician Alan Turing, a pioneer of AI, began theorizing a "machine that could solve any problem that could be described by simple instructions encoded on a paper tape."[40] By the 1950s, Turing began questioning the possibility of making machines that could think by mimicking the human brain.[41] Just like human beings, Turing's thinking machines would be created with the intelligence and abilities of a toddler and trained through a system of rewards and punishments.[42]

In the fifty years that followed Turing's groundbreaking work, AI went through a rollercoaster of breakthroughs and setbacks.[43] Decades of governmental funding and interest that spurred technological advancements were followed by "AI winter[s]" that saw little progress in the field.[44] The 1980s and early 1990s saw some groundbreaking discoveries, such as breakthroughs in the use and development of neural nets.[45] But it wasn't until the 2000s and the contemporaneous expansion of the internet that AI began its steady rise.[46]

"Big data," made available by the growth of the internet combined with increasingly sophisticated computers,[47] has enabled modern AI machines to store immense knowledge and further, to use that knowledge to solve problems.[48] The field currently contains several subfields that correspond to different

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[40] Ian Watson, *How Alan Turing Invented the Computer Age*, SCI. AM. (Apr. 26, 2012), https://blogs.scientificamerican.com/guest-blog/how-alan-turing-invented-the-computer-age/ [https://perma.cc/GF4H-WZHQ].

[41] Alan M. Turing, *Computing Machinery and Intelligence*, 49 MIND 433, 454–60 (1950). In his revolutionary paper, Turing asked a question that is still highly debated today: "[c]an machines think?" *Id.* at 433.

[42] *Id.*

[43] *See* Rockwell Anyoha, *The History of Artificial Intelligence*, HARV. UNIV. (Aug. 28, 2017), https://sitn.hms.harvard.edu/flash/2017/history-artificial-intelligence/ [https://perma.cc/46SJ-BAT9].

[44] *See id.*; Tanya Lewis, *A Brief History of Artificial Intelligence*, LIVE SCI., (Dec. 4, 2014) https://www.livescience.com/49007-history-of-artificial-intelligence.html [https://perma.cc/ZQ8B-A9B4].

[45] Neural nets or networks are conglomerates "of thousands or even millions of simple processing [data points] that are densely interconnected." Larry Hardesty, *Explained: Neural Networks*, MIT NEWS (Apr. 14, 2017), https://news.mit.edu/2017/explained-neural-networks-deep-learning-0414 [https://perma.cc/4E2L-B4FG]. They are modeled after human brain cells and allow computers to learn by example. *See id.*

[46] *See* Mohamad Dia, *A Brief History of AI*, THAT'S AI, https://www.thats-ai.org/en-GB/units/a-brief-history-of-ai [https://perma.cc/SX94-J7NQ].

[47] "Big data refers to the large, diverse sets of information that grow at ever-increasing rates." Troy Segal, *What is Big Data? Definition, How it Works, and Uses*, INVESTOPEDIA, https://www.investopedia.com/terms/b/big-data.asp [https://perma.cc/8479-M2PQ]; *see How AI Changed—In a Very Big Way—Around the Year 2020*, MIND MATTERS (Dec. 7, 2021) https://mindmatters.ai/2021/12/how-ai-changed-in-a-very-big-way-around-the-year-2000/ [https://perma.cc/ZPR9-PJLQ] (podcast interview with author Erik J. Larson).

[48] *What Is Artificial Intelligence (AI)?*, *supra* note 8.

ways in which machines can learn.[49] Machine learning, for example, uses algorithms to make predictions and decisions based on data organized and structured by data scientists.[50] Deep learning, on the other hand, requires far less human intervention and instead uses "algorithms to train neural networks to recognize patterns and make predictions" by analyzing "unstructured data in its raw form (e.g., text or images)."[51] Yet another subset of AI, called generative AI, combines machine learning and deep learning neural nets to "learn the patterns and characteristics of [raw input] data" and generate new, original output data.[52] It is within this subfield that DABUS was born.

B. The Birth of DABUS

DABUS, which stands for "Device for the Autonomous Bootstrapping of Unified Sentience," is an "artificial neural system."[53] The machine is the pinnacle of Dr. Thaler's research in the field of AI and machine learning, which spans almost five decades.[54]

In his early experiments with artificial neural systems, more than thirty years before DABUS was born, Dr. Thaler discovered that by inputting information into the systems and then simulating neuron death,[55] the neural nets would generate outputs containing novel ideas to which the network had not

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[49] *See id.*; *see also What Is Machine Learning*, IBM, https://www.ibm.com/topics/machine-learning [https://perma.cc/34DF-ZPGZ].

[50] *What Is Machine Learning*, *supra* note 49 (explaining that machine learning depends on "[h]uman experts [to] determine [a] set of features to understand the differences between data inputs").

[51] *Generative AI vs Machine Learning vs Deep Learning Differences*, REDBLINK TECH. (Mar. 16, 2023), https://redblink.com/generative-ai-vs-machine-learning-vs-deep-learning/#Generative_AI_Vs_Machine_Learning_Vs_Deep_Learning [https://perma.cc/97LQ-CT5J]; *What Is Machine Learning*, *supra* note 49.

[52] *Generative AI vs Machine Learning vs Deep Learning Differences*, *supra* note 51.

[53] *DABUS Explained to the AIPLA*, *supra* note 6. Artificial neural systems or networks "simulate the network of neurons that make up a human brain so that the computer will be able to learn things and make decisions in a humanlike manner." Bernard Marr, *What Are Artificial Neural Networks—A Simple Explanation for Absolutely Anyone*, FORBES (Sept. 24, 2018, 12:46 AM), https://www.forbes.com/sites/bernardmarr/2018/09/24/what-are-artificial-neural-networks-a-simple-explanation-for-absolutely-anyone/?sh=782527b91245 [https://perma.cc/D9FA-STDJ].

[54] *IEI History*, IMAGINATION ENGINES INC., https://imagination-engines.com/history.html [https://perma.cc/VQ7L-888U].

[55] "Neuron death" in this context refers to the process of gradually interrupting the influx of inputs to the artificial neuron systems, which mimics the death of neural connections between neurons in the human brain. *See* Holmes, *supra* note 5.

been exposed.[56] For example, by inputting data patterns found in songs, literary works, or chemistry and gradually perturbing the networks,[57] the machine would generate new musical, literary, or chemical patterns it had never seen or heard.[58] This scientific breakthrough resulted in the creation of networks called "imagination engines" or "imagitrons."[59] While imagitrons have the ability to generate meaningful concepts, their outputs are often a combination of logical and nonsensical patterns.[60] To obviate the issue of obtaining hundreds of thousands of potentially nonsensical outputs, Dr. Thaler conceived a machine capable of evaluating its own outputs. The result was a Creativity Machine, which consists of two or more neural nets: an imagination engine generating ideas and an "alert associative center" filtering through the ideas to identify novel and valuables ones.[61]

Thanks to the synergy of the artificial neural networks, Creativity Machines are able to mimic the human thought process.[62] In the human brain, neurons receive "raw sensory inputs from our five senses [that] activate mental images or feelings," which are then used to formulate thoughts.[63] Similarly, Creativity Machines receive inputs of raw data and use them to generate and compare patterns; the machines store the newly

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[56] *IEI History*, *supra* note 54 (explaining his 1976 and 1988 experiments); *see also Imagination Engines (a.k.a., "Imagitrons")*, IMAGINATION ENGINES INC., https://imagination-engines.com/ie.html [https://perma.cc/8KXV-7663].

[57] Perturbing, in this context, refers to creating a disturbance to the internal structure of artificial neural systems. In AI, the disturbance is created by adding noise, whereas, in the human brain, it is created by heat. Aaron M. Cohen & Stephen L. Thaler, *Stephen Thaler's Imagination Machines*, 43(4) FUTURIST 28, 28 (2009), https://www.researchgate.net/publication/299169623_Stephen_Thaler's_Imagination_Machines [https://perma.cc/5ZV7-CGHA]. Noise refers to "unwanted behavior within data." *What is Noise in Machine Learning?*, IGUAZIO, https://www.iguazio.com/glossary/noise-in-ml/ [https://perma.cc/6Q4Y-4A6B].

[58] *Imagination Engines (a.k.a., "Imagitrons")*, *supra* note 56.

[59] *IEI's Patented Creativity Machine® Paradigm*, IMAGINATION ENGINES INC., https://imagination-engines.com/cm.html [https://perma.cc/83KX-7EQE].

[60] *Imagination Engines (a.k.a., "Imagitrons")*, *supra* note 56.

[61] Stephen L. Thaler, *Neural Networks That Autonomously Create and Discover (US Patent 5,659,666)*, IMAGINATION ENGINES INC., https://imagination-engines.com/pcai-cm.html [https://perma.cc/6U33-TSMQ]; Stephen L. Thaler, *DABUS in a Nutshell*, 19 PHIL. & COMPUT. (The Am. Phil. Ass'n.), no. 1, 2019, at 40, https://cdn.ymaws.com/www.apaonline.org/resource/collection/EADE8D52-8D02-4136-9A2A-729368501E43/ComputersV19n1.pdf [https://perma.cc/X9TV-RCBQ]; *IEI's Patented Creativity Machine® Paradigm*, *supra* note 59; U.S. Patent No. 5,659,666 (filed Oct. 13, 1994) (granted Aug. 19, 1997). Coincidentally, patent No. 5,659,666 was granted on the same day "SkyNet, the fictional AI-based defense satellite system of the Terminator series, becomes conscious and destroys the world." *IEI History*, *supra* note 54.

[62] *See Neural Networks That Autonomously Create and Discover (US Patent 5,659,666)*, *supra* note 61 (describing Creativity Machines as "potential model[s] of human creativity and the stream of consciousness which fuels it").

[63] *IEI's Patented Creativity Machine® Paradigm*, *supra* note 59.

learned patterns as associative memories, which they then use to formulate logical ideas.[64]

Having successfully trained artificial neural networks to think, Dr. Thaler took his Creativity Machine one step further and taught it to train itself. In 1996, the scientist devised an artificial neural network that could learn and store knowledge without the need for human-invented training.[65] "'Self-Training Artificial Neural Network Objects', or STANNOs," pair "an untrained neural network (i.e., a trainee) with a network that has learned by example how to train another net (i.e., a trainer)."[66] Through a continuous process of trial and error and information sharing, the paired networks are capable of "exhaust[ing] all potential discoveries concealed within vast databases."[67] By incorporating STANNO networks into Creativity Machines, Dr. Thaler created an AI machine capable of autonomously thinking, evaluating its ideas, and cumulatively learning from its mistakes to continuously improve the quality and complexity of its thoughts.[68]

During the late 1990s and early 2000s, Dr. Thaler's relentless dedication to improving his Creativity Machine led to remarkable scientific triumphs, defying expectations and achieving what many thought possible only in science fiction movies.[69] Then, in the late 2000s, came another breakthrough: the birth of DABUS.[70] DABUS revolutionized the idea of

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[64] *Id.*; *see* Ilsa Godlovitch, *Creativity Machine Granted a Patent*, MSN NEWS, https://imagination-engines.com/pdf/MSN_News97.pdf [https://perma.cc/8X7K-KGP2] (reporting Dr. Thaler's claim that Creativity Machines "could be used to invent new music or paint an original masterpiece"). Associative memory refers to "[t]he ability to remember relationships between unrelated items." Emily Henderson, *Neuroscientists Discover How Associative Memories Are Formed*, NEWS MED. (Sept. 23, 2021), https://www.news-medical.net/news/20210923/Neuroscientists-discover-how-associative-memories-are-formed.aspx [https://perma.cc/8Q92-RXTV].

[65] *Self-Training Artificial Neural Network Object (STANNOs)*, IMAGINATION ENGINES INC., https://imagination-engines.com/stanno.html [https://perma.cc/V23X-5Z5E]; *IEI History*, *supra* note 54.

[66] *Self-Training Artificial Neural Network Object (STANNOs)*, *supra* note 65; *see* U.S. Patent No. 5,845,271 (filed Jan. 26, 1996).

[67] *Self-Training Artificial Neural Network Object (STANNOs)*, *supra* note 65.

[68] *Id.*

[69] *See* Tina Hesman, *Computer Creativity Machine Stimulates the Humab Brain*, ST. LOUIS POST DISPATCH (Jan. 25, 2004), http://www.umsl.edu/~sauterv/DSS/creativitymachine_12504.html [https://perma.cc/8VUN-PA6J] (explaining that some people perceived Dr. Thaler's Creativity Machines as "the beginning of 'Terminator' technology"); *see generally IEI History*, *supra* note 54 (outlining Dr. Thaler's achievements from the creation of the Creativity Machine to 2021).

[70] While DABUS's exact date of birth is unknown, it appears that Dr. Thaler began working on the machine in 2008. Helen McFadzean, *What Do an AI Machine and a Monkey Have in Common? DABUS Challenges Current Legal Principles on Inventorship*, PHILLIPS ORMONDE FITZPATRICK (Mar. 12, 2021), https://www.pof.com.au/what-do-an-ai-machine-and-a-monkey-have-in-common-dabus-challenges-current-legal-principles-on-inventorship/ [https://perma.cc/FRJ5-GT6M].

Creativity Machines by replacing the original concept of two interacting neural networks with a multitude of "disconnected neural nets" instead.[71] Each neural net in DABUS represents a conceptual space containing "sequential associations of words related to a given topic," referred to as "interrelated memories."[72] The introduction of "carefully controlled chaos" prompts the nets to constantly bind and detach based on word association.[73] Through this process, the nets undergo "cumulative cycles of learning and unlearning," which ultimately lead them to form chains "encod[ing] complex concepts and their consequences."[74] Based on the identified consequences, DABUS "trigger[s] the release of simulated reward or penalty neurotransmitters to either reinforce any worthwhile idea or otherwise erase it."[75] Ideas considered worthwhile are then self-evaluated based on their novelty and utility and stored as "long term memories."[76] During this process, DABUS continually learns from its newly developed ideas and uses the knowledge to form new chains and new ideas.[77] Thus, the machine is able to autonomously bootstrap the production of novel outputs without further human inputs.[78]

C. Artificial Intelligence's Contribution to Society

AI machines have contributed to society well before the birth of DABUS. Since the dawn of the AI field,[79] scientists have worked to ensure that AI could fulfill its purpose of improving people's lives by enhancing their productivity, freeing them from

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[71] *DABUS Described*, IMAGINATION ENGINES INC., https://imagination-engines.com/dabus.html [https://perma.cc/KL8H-Z2NB]; Thaler, *supra* note 61, at 40; U.S. Patent No. 10,423,875 (filed Jan. 2, 2015).

[72] *Frequently Asked Questions*, ARTIFICIAL INVENTOR PROJECT, https://web.archive.org/web/20230128221340/https://artificialinventor.com/frequently-asked-questions/ [https://perma.cc/HQ6N-CAQC]; *DABUS Described*, *supra* note 71; *see* Thaler, *supra* note 61, at 40.

[73] Thaler, *supra* note 61, at 40.

[74] *DABUS FAQ*, *supra* note 7; *DABUS Described*, *supra* note 71; Thaler, *supra* note 61, at 40.

[75] Tiera Oliver & Taryn Engmark, *Who's IP Is It? The AI Inventor or the AI's Inventor?*, EMBEDDED COMPUTING DESIGN (Sept. 10, 2021), https://embeddedcomputing.com/technology/ai-machine-learning/whos-ip-is-it-the-ai-inventor-or-the-ais-inventor [https://perma.cc/V9WC-E6BW].

[76] *DABUS Described*, *supra* note 71; Thaler, *supra* note 61, at 40.

[77] *See DABUS Described*, *supra* note 71.

[78] While bootstrapping usually refers to the ability to succeed without external help, in data science, bootstrapping refers to "a method of inferring results for a population from results found on a collection of smaller random samples of that population, using replacement during the sampling process." *What Is Bootstrapping?*, MASTER'S DATA SCI., https://www.mastersindatascience.org/learning/machine-learning-algorithms/bootstrapping [https://perma.cc/PN7V-7FFG].

[79] The AI field was founded in 1956. Lewis, *supra* note 44.

monotonous tasks, simplifying and improving efficiency in business activities, and ensuring people's safety.[80] For example, Dr. Oliver Selfridge, a pioneer in computer vision, developed the technology behind character recognition in the late 1950s.[81] That same technology now enables law enforcement to find, identify, and track missing persons and criminals.[82] It also helps doctors "detect pain, monitor patients' health status, or even identify symptoms of some illnesses."[83] And during the COVID-19 pandemic, when handling cash became hazardous, face recognition—a technology powered by AI—made contactless payments possible.[84] Similarly, studies on natural language processing—the science responsible for autocorrect, language translators, chatbots, voice assistants, and much more[85]—evolved in the 1960s.[86]

Dr. Thaler's machines have contributed to society for over two decades.[87] In 1998, a Creativity Machine created by the Wright-Patterson Air Force Base following Dr. Thaler's design made groundbreaking findings in chemistry and physics.[88] The following year, the US Department of Defense began testing the use of Creativity Machines to design enhanced defense apparatuses.[89] Since then, these AI machines and the technology behind them have improved society by providing innovative solutions to issues in various fields. NASA, for example, has tested the use of STANNOs and

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[80] Gao, *supra* note 38.

[81] PETER STONE ET AL., STANFORD UNIV., ARTIFICIAL INTELLIGENCE & LIFE IN 2030 50–51 (2016), https://ai100.stanford.edu/sites/g/files/sbiybj18871/files/media/file/ai100report10032016fnl_singles.pdf [https://perma.cc/6NH6-XLCG].

[82] *See, e.g.*, *Facial Recognition: Top 7 Trends (Tech, Vendors, Use Cases)*, THALES GRP., https://www.thalesgroup.com/en/markets/digital-identity-and-security/government/biometrics/facial-recognition [https://perma.cc/2YWR-VTZM]; *NYPD Questions and Answers Facial Recognition*, NYPD, https://www.nyc.gov/site/nypd/about/about-nypd/equipment-tech/facial-recognition.page [https://perma.cc/UG65-KE2H].

[83] *See* Melanie Johnson, *Face Recognition in Healthcare: Key Use Cases*, VISAGE TECHS. (Jan. 21, 2022), https://visagetechnologies.com/face-recognition-in-healthcare/ [https://perma.cc/UY4U-33V7].

[84] *See* Anton Nazarkin, *2022—The Year that Facial Recognition Will Lead the Fintech Industry*, FIN. DIGEST, https://www.financedigest.com/2022-the-year-that-facial-recognition-will-lead-the-fintech-industry.html [https://perma.cc/86JQ-U3LW].

[85] Abhishek Sharma, *Top 10 Applications of Natural Language Processing (NLP)*, ANALYTICS VIDHYA (July 8, 2020), https://www.analyticsvidhya.com/blog/2020/07/top-10-applications-of-natural-language-processing-nlp/ [https://perma.cc/N3VJ-QH29].

[86] STONE, *supra* note 4, at 50.

[87] *See generally IEI History*, *supra* note 54 (listing the uses of Dr. Thaler's machines through the decades).

[88] The machine discovered "approximately a half-million new potential chemical compounds" and materials, including "high temperature superconductors [and] trans-diamond ultrahard materials." *Id.*

[89] *Id.*; Stephen L. Thaler, *The Warhead Design Creativity Machine*, 3 WEAPON SYS. TECH. INFO. ANALYSIS CTR. NEWSL., Dec. 2001, at 4–5, https://imaginationengines.com/pdf/ADA399545.pdf [https://perma.cc/5B8S-DFL2].

Creativity Machines to achieve "autonomous space vehicle docking."[90] A Creativity Machine is also responsible for developing the optimal design of what became the Oral-B CrossAction toothbrush.[91] Recently, there have even been studies about harnessing this technology "to emulate trained dogs' ability to detect cancer and other diseases."[92]

What made these valuable contributions possible, in part, was the guarantee that those who invented the technology behind them could receive legal protection for their products and benefit from them.[93] Specifically, they operated under the correct assumption that they could "receive government-sanctioned monopolies to exploit commercial embodiments of their [works]."[94] These "government-sanctioned monopolies" are also known as IP rights.[95]

II. INTELLECTUAL PROPERTY IN THE UNITED STATES

Intellectual property refers to intangible assets often called "creations of the mind, such as inventions; literary and artistic works; designs; and symbols, names and images used in commerce."[96] Two of the most common types of intellectual property are copyrights and patents.[97] Copyrights confer exclusive rights for "original works of authorship as soon as an author fixes the work in a tangible form of expression."[98] The protection lasts for the author's lifetime plus an additional seventy years after the author's death.[99]

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[90] *See* Clinton Patrick, Stephen L. Thaler, & Katherine Stevenson-Chavis, *Demonstration of Self-Training Autonomous Neural Networks in Space Vehicle Docking Simulations*, NASA MARSHALL SPACE FLIGHT CTR., https://ntrs.nasa.gov/api/citations/20070018815/downloads/20070018815.pdf [https://perma.cc/6DS6-4LAR].

[91] Hesman, *supra* note 69.

[92] *See* Prachi Patel, *AI System Can Sniff Out Disease as Well as Dogs Do*, SCI. AM. (Mar. 4, 2021), https://www.scientificamerican.com/article/ai-system-can-sniff-out-disease-as-well-as-dogs-do/ [https://perma.cc/RU3S-YMWU].

[93] *See generally* Lukas Bleidorn, *How Does Intellectual Property Protection Affect Innovation*, REDPOINTS, https://www.redpoints.com/blog/how-does-intellectual-property-protection-affect-innovation/ [https://perma.cc/TR38-QWT2] (explaining how IP rights incentivize the development of innovative ideas).

[94] Anna Carnochan Comer, *AI: Artificial Inventor or the Real Deal?*, 22 N.C. J.L. & TECH. 447, 475 (2021).

[95] *Id.*

[96] *What Is Intellectual Property?*, WIPO, https://www.wipo.int/about-ip/en/ [https://perma.cc/R9YT-6Y85].

[97] *See id.*

[98] *What Is Copyright?*, U.S. COPYRIGHT OFF., https://www.copyright.gov/what-is-copyright/ [https://perma.cc/NY84-EZ2G] (emphasis omitted).

[99] 17 U.S.C. § 302(a).

Patents, on the other hand, grant exclusive rights for inventions.[100] Specifically, utility patents protect "product[s] or . . . process[es] that provide[] . . . a new way of doing something,"[101] such as airbags or Amazon's One-Click ordering system.[102] Design patents protect "new, original and ornamental design for an article of manufacture,"[103] such as the design of Coca-Cola bottles or the lens configuration of iPhone cameras.[104] The exclusive rights begin when a patent is issued and last twenty years for utility patents and fifteen years for design patents.[105]

In the United States, laws governing copyrights and patents stem from Article I, Section 8, Clause 8 of the US Constitution.[106] The clause, often called the "Intellectual Property Clause" or "Patent and Copyright Clause,"[107] grants Congress the power "to promote the [p]rogress of [s]cience and useful [a]rts, by securing for limited [t]imes to [a]uthors and [i]nventors the exclusive [r]ight to their respective [w]ritings and [d]iscoveries."[108] While little is known about the framers' motivation for including the Intellectual Property Clause in the Constitution,[109] its significance is unequivocal. The United States was the first country in history to include a provision relating to IP in its founding document.[110] The clause was unanimously approved without any debate, suggesting that its

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[100] *Patents*, *supra* note 35.

[101] *Id.*

[102] U.S. Patent No. 2,649,311 (filed Aug. 5, 1952); U.S. Patent No. 5,960,411 (filed Sept. 12, 1997).

[103] 35 U.S.C. § 171(a).

[104] U.S. Patent No. D739,733 S (filed Feb. 14, 2014); U.S. Patent No. D966,226 S (filed Mar. 14, 2022).

[105] 35 U.S.C. §§ 154(a)(2), 173.

[106] *ArtI.S8.C8.1 Overview of Congress's Power Over Intellectual Property*, CONST. ANNOTATED, https://constitution.congress.gov/browse/essay/artI-S8-C8-1/ALDE_00013060/ [https://perma.cc/MTZ8-QDF8].

[107] *Intellectual Property Clause,* CORNELL L. SCH. LEGAL INFO. INST., https://www.law.cornell.edu/wex/intellectual_property_clause [https://perma.cc/3GJU-RP7R].

[108] U.S. CONST. art. I, § 8, cl. 8.

[109] *Compare* Thomas Nachbar, *Patent and Copyright*, HERITAGE FOUND., https://www.heritage.org/constitution/#!/articles/1/essays/46/patent-and-copyright-clause [https://perma.cc/6HXV-4VCG] (arguing that the IP Clause was a mere "after-thought" that did not "represent[ ] a legal tradition of great historical and practical significance to the Framers"), *with* Gene Quinn, *Patents, Copyrights and the Constitution, Perfect Together*, IPWATCHDOG (Feb. 19, 2018, 2:56 PM), https://ipwatchdog.com/2018/02/19/patents-copyrights-constitution/id=93941/ [https://perma.cc/LEE8-H98W] (arguing that the "founding fathers deemed intellectual property rights so vitally important to the success and stability of our new country that these rights were written into the Constitution").

[110] Adam Mossoff, *The Constitutional Protection of Intellectual Property*, HERITAGE FOUND. (Mar. 8, 2021), https://www.heritage.org/economic-and-property-rights/report/the-constitutional-protection-intellectual-property [https://perma.cc/KA5G-N6G].

importance was clear to the founding fathers.[111] Its uniqueness and significance also derive "from its status as the only enumerated power granted to Congress that explicitly defines the mechanism for exercising this power."[112]

Shortly after the Constitution was ratified, Congress began exercising its powers over patents and copyrights.[113] The first Patent Act and Copyright Act, enacted in 1790, were among the first laws that Congress ever promulgated.[114] These and subsequent statutes "spurred the explosive growth in the US innovation economy from the nineteenth century through today,"[115] and contributed to making the United States the country with the best intellectual property environment in the world.[116]

The current Copyright Act, enacted in 1978, stipulates the subject matter for which a copyright may be granted and the exclusive rights granted to copyright owners.[117] Works eligible for copyright must be "original works of authorship fixed in any tangible medium of expression."[118] If a work is eligible, no further action is needed to secure copyright protection and for copyright owners to begin enjoying the exclusive rights granted to them.[119]

While the Copyright Act does not expressly define "authorship" or "author," indicia in the text suggest that authors must be human.[120] For example, the Act specifies that an author's "widow or widower," or "children or grandchildren" may inherit the copyright at the author's death.[121] The assumption

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[111] Jacob R. Weaver, *The Forgotten History of the Intellectual Property Clause*, FEDERALIST SOC'Y (Apr. 8, 2021), https://fedsoc.org/commentary/fedsoc-blog/the-forgotten-history-of-the-intellectual-property-clause [https://perma.cc/JQK3-RQCE]; *see* THE FEDERALIST NO. 43 (James Madison) ("The utility of this power will scarcely be questioned.").

[112] Edward C. Walterscheid, *To Promote the Progress of Science and Useful Arts: The Background and Origin of the Intellectual Property Clause of the United States Constitution*, 2 J. INTELL. PROP. L. 1, 54 (1994).

[113] *See* Quinn, *supra* note 109.

[114] *Id.*

[115] Massoff, *supra* note 110.

[116] U.S. CHAMBER COM. GLOB. INNOVATION POL'Y CTR., 2022 INTERNATIONAL IP INDEX 61 (10th ed. 2022), https://www.theglobalipcenter.com/wp-content/uploads/2022/02/2022-IP-Index-Final-Report.pdf [https://perma.cc/6W4J-TWV8].

[117] *See* Copyright Act of 1976, Pub. L. No. 94-553, 90 Stat. 2541 (codified as amended at 17 U.S.C. §§ 101–1511).

[118] 17 U.S.C. § 102(a).

[119] Copyright in a work begins the moment the work is created. Registration of a copyrighted work with the USCO is permissive, but becomes necessary if the copyright owner wants to bring a copyright infringement suit. *What is Copyright?*, *supra* note 98; *see* 17 U.S.C. § 408. See 17 U.S.C. § 106 for a list of the exclusive rights granted to copyright owners.

[120] *See, e.g.*, 17 U.S.C. § 203 (referring to an author using the pronouns "his" and "her" and referring to an author's death, children, and spouses).

[121] *Id.* § 203(a)(2)(A).

that an author can get married, have children and grandchildren, and die implies humanity, and courts have long agreed with this interpretation.[122] As early as 1884, the Supreme Court interpreted "author" to refer to a human being by defining the term as "*he* to whom anything owes its orign [sic]; originator; maker; one who completes a work of science or literature."[123] A century later, the Court specified in *Community for Creative Non-Violence v. Reid* that an author is "the *person* who translates an idea into a fixed, tangible expression entitled to copyright protection."[124] Accordingly, the USCO has included a "human authorship requirement" in its administrative manual, instructing agency staff to "refuse to register a claim if it determines that a human being did not create the work."[125]

Patent law, which applies to a "new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof,"[126] has reached a similar result by expressly defining who can be an inventor.[127] The Patent Act of 1952 statutorily defines "inventor" as "the *individual* . . . who invented or discovered the subject matter of the invention."[128] While the Act does not further define whether an individual must be a human being, courts and the USPTO have consistently interpreted it to mean "natural person."[129]

III. INTELLECTUAL PROPERTY AND ARTIFICIAL INTELLIGENCE

Patent and copyright laws are territorial and vary by country.[130] Thus, it is not uncommon to see variations in IP laws

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[122] *See id.*; *see* Letter from Copyright Review Board to Ryan Abbott, *supra* note 13 at 3 ("Courts interpreting the Copyright Act, including the Supreme Court, have uniformly limited copyright protection to creations of human authors.").

[123] Burrow-Giles Lithographic Co. v. Sarony, 111 U.S. 53, 58 (1884) (emphasis added).

[124] Cmty. for Creative Non-Violence v. Reid, 490 U.S. 730, 737 (1989) (emphasis added) (citing 17 U.S.C. § 102). The Supreme Court has not revisited the issue since *Community for Creative Non-Violence v. Reid* was decided.

[125] COMPENDIUM (THIRD) § 306.

[126] 35 U.S.C. § 101.

[127] *See id.* § 100.

[128] *Id.* (emphasis added).

[129] Univ. of Utah v. Max-Planck-Gesellschaft Zur Forderung Der Wissenschaften E.V., 734 F.3d 1315, 1323 (Fed. Cir. 2013) ("[I]nventors must be natural persons."); *see* Thaler v. Hirshfeld, 558 F. Supp. 3d 238, 242 (E.D. Va. 2021); *see* Thaler, 2020 Dec. Comm'r Pat. 4.

[130] Michael S. Denniston, *International Copyright Protection: How Does It Work?*, BRADLEY (Mar. 28, 2012), https://www.bradley.com/insights/publications/2012/03/international-copyright-protection-how-does-it-w__ [https://perma.cc/4S8N-THX7]; *Frequently Asked Questions: Patents*, WIPO, https://www.wipo.int/patents/en/faq_patents.html [https://perma.cc/G3VN-98K6].

around the world.[131] This part provides an overview of how different countries have treated AI-generated IP. Specifically, it focuses on DABUS's outputs and the test cases that Dr. Thaler and his team initiated globally to prompt debate surrounding the inadequacies of IP laws in light of the technical advancements of AI. The countries discussed are the ones that have already expressed an opinion on AI-generated IP or on DABUS specifically. The comparison of the IP regimes in the United States, United Kingdom, Canada, Australia, and South Africa highlights that the treatment that these novel IP claims have received varies both by IP type and by country.

A. AI Contributions to IP

Before delving into the current treatment of AI-generated IP, it is important to note that artificial intelligence machines are not new to creating assets considered suitable for IP protection. Aaron, a computer program developed by artist and professor Harold Cohen, began making art in the late 1970s.[132] Its works have since been shown in museums around the world.[133] Dr. Thaler's own machines have generated several copyrighted assets, including "11,000 new musical hooks," images, a "compendium of over 1.5 million new, potential, functional English words," and a musical album.[134]

AI's contributions are not limited to copyrightable assets. The scientific world is also a breeding ground for inventions and discoveries generated entirely or partially by AI machines. In 2021, a German biotech company began testing a new anticancer

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[131] For example, some countries grant copyright for the life of the author plus fifty years rather than seventy. *See* Jonathan Bailey, *Which Country Has the Longest Copyright Term?*, PLAGIARISMTODAY (Sept. 23, 2015), https://www.plagiarismtoday.com/2015/09/23/which-country-has-the-longest-copyright-term/ [https://perma.cc/K9SV-QESQ]. Under patent law, some countries allow for the patentability of software on its own, whereas other do not. *Differences in Patent Eligibility Around the World*, MORNINGSIDE (Sept. 6, 2018), https://www.morningtrans.com/differences-in-patent-eligibility-around-the-world/ [https://perma.cc/KL2R-JDJY].

[132] Mark K. Anderson, *'Aaron': Art From the Machine*, WIRED (May 12, 2001, 2:00 AM), https://www.wired.com/2001/05/aaron-art-from-the-machine/ [https://perma.cc/MLP7-N3HK].

[133] *See* Kate Vass, *Harold Cohen*: *'Once Upon A Time There Was An Entity Named Aaron,'* KATE VASS GALERIE (Apr. 30, 2020), https://www.katevassgalerie.com/blog/harold-cohen-aaron-computer-art [https://perma.cc/9826-ZFPK]. Importantly, Aaron was not fully autonomous, and Mr. Cohen never attempted to register its works by listing the AI as the author.

[134] *IEI History*, *supra* note 54. Note that these assets are copyrighted but not registered with the USCO.

molecule created by an AI program.[135] Google recently admitted to using AI to design chip floorplans.[136] As previously mentioned, Dr. Thaler's own Creativity Machines have created the design for products ranging from toothbrushes to warheads.[137] According to the scientist, the machine even invented one of his subsequent AIs, for which the scientist received a patent.[138]

If AI has been a major player in the IP arena for decades, what is it about DABUS that has sparked debates around the world? The answer rests on the copyright and patent applications that Dr. Thaler filed. In fact, while AI machines have often been on those same documents, they have never been listed as authors or inventors.[139] Current technology has made it possible for AI to go from a mere tool used to assist in the development of IP to becoming the mind behind the "creative and innovation processes" that generate novel IP.[140] Yet, while technology has advanced, the law has not kept up.

B. Copyright: The DABUS Case Study

DABUS's artistic career began shortly after its birth. In 2014, after being exposed to a large number of photographs, the machine produced a series of new images.[141] In the same year, Dr. Thaler conducted an experiment with DABUS similar to the one that had jumpstarted his career in the 1970s.[142] By "snipping . . . connections within DABUS," the scientist was able

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[135] Neil Savage, *Tapping into the Drug Discovery Potential of AI*, BIOPHARMA DEALMAKERS (May 27, 2021), https://www.nature.com/articles/d43747-021-00045-7 [https://perma.cc/7P2R-PXHX].

[136] Notably, Google's lawyers admitted that they are unsure whether they will be able to patent the AI-generated chips due to the current patent framework. Katyanna Quach, *Tech Industry Stuck Over Patent Problems with AI Algorithms*, REGISTER (Aug. 10, 2022), https://www.theregister.com/2022/08/10/ai_patent_ip/ [https://perma.cc/MG3E-YNGN].

[137] Hesman, *supra* note 69.

[138] *See* Ryan Abbott, *I Think, Therefore I Invent: Creative Computers and the Future of Patent Law*, 57 B.C. L. REV. 1079, 1085–86 (2016) (explaining that, while Dr. Thaler did not disclose that the AI machine was the actual inventor in his patent application, if his assertions are true, the USPTO has already unknowingly granted a patent for an AI-generated invention); *see* U.S. Patent No. 5,852,815 (filed May 15, 1998).

[139] *See* Ryan Abbott, *The Artificial Inventor Project*, WIPO MAGAZINE (Dec. 2019), https://www.wipo.int/wipo_magazine/en/2019/06/article_0002.html [https://perma.cc/9DT9-Q7C3] ("[N]o one has ever disclosed an AI's role in . . . a patent application.").

[140] Tom Dunlap, *Artificial Intelligence (AI) as an Inventor?* DUNLAP BENNETT & LUDWIG (Mar. 22, 2023), https://www.dbllawyers.com/artificial-intelligence-as-an-inventor/ [https://perma.cc/9HCL-FNYB].

[141] *Machine Generated Art*, IMAGINATION ENGINES INC., https://imagination-engines.com/cm_art.html [https://perma.cc/4LLH-XM58] ("Note that these were full 640x480 pixel, 24 bit depth renderings and not attempts at replacing small patches of existing photos with substitute imagery.").

[142] *See id.*; *see generally IEI History*, *supra* note 54 (explaining his 1976 and 1988 experiments).

to simulate neuron death yet again.[143] The result was a series of imageries that depicted DABUS's near-death experience accompanied by its explanation of the artwork.[144] One of these images, *A Recent Entrance to Paradise*, became the focal point of the copyright community when Dr. Thaler set out to obtain copyright protection for it.[145] As an "original work[] of authorship fixed in [a] tangible medium of expression," the artwork fit squarely within the purview of the Copyright Act.[146] However, while the subject matter of Dr. Thaler's application did not raise concerns, the identity of the author did, as the scientist listed DABUS itself.[147] Although Dr. Thaler's copyright efforts are still at an early stage, this section provides a comparison of the legal treatment of AI-generated copyrightable assets in the United States, United Kingdom, and Canada to offer three contrasting approaches.

1. United States: The Insurmountable Human-Author Requirement

In 2018, Dr. Thaler filed an application with the US Copyright Office to register *A Recent Entrance to Paradise* and listed "Creativity Machine" as the author of the artwork.[148] A note in the application explained that the AI had autonomously created the work and that the scientist was "seeking to register [it] as a work-for-hire to [himself as] the owner of the Creativity Machine."[149] Less than a year later, the USCO denied Dr. Thaler's application after determining that it "lack[ed] the human authorship necessary to support a copyright claim."[150]

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[143] *Machine Generated Art*, *supra* note 141.

[144] Stephen Thaler, *Artificial Intelligence—Visions (Art) of a Dying Synthetic Brain*, URBASM (May 18, 2016), https://www.urbasm.com/2016/05/artificial-intelligence-visions-art-of-a-dying-brain/ [https://perma.cc/2KHL-ZP2Z].

[145] Feldman, *supra* note 11.

[146] 17 U.S.C. § 102(a).

[147] Feldman, *supra* note 11.

[148] Ross J. Charap & Matthew Finkelstein, *Trouble in Paradise: Copyright Office Rejects AI-"Authored" Work for Copyright Registration*, ARENTFOX SCHIFF (Mar. 8, 2022), https://www.afslaw.com/perspectives/alerts/trouble-paradise-copyright-office-rejects-ai-authored-work-copyright [https://perma.cc/8NLU-G94T].

[149] Letter from Copyright Review Board to Ryan Abbott, *supra* note 13, at 2; 17 U.S.C. § 101 ("A 'work made for hire' is– (1) a work prepared by an employee within the scope of his or her employment; or (2) a work specially ordered or commissioned . . . if the parties expressly agree in a written instrument signed by them that the work shall be considered a work made for hire.").

[150] Letter from Copyright Review Board to Ryan Abbott, *supra* note 13, at 2 (quoting Initial Letter Refusing Registration from U.S. Copyright Office to Ryan Abbott (Aug. 12, 2019)).

Over the following three years, Dr. Thaler filed two requests for reconsideration.[151] Both times the USCO affirmed its original refusal.[152] The Copyright Review Board (Board) rejected the scientist's argument that the human-author requirement was unsupported by law.[153] Citing to *Burrow-Giles Lithographic v. Sarony* and its progeny, the Board explained how courts across the country,[154] including the Supreme Court, have long agreed that authors have to be human for their work to qualify for copyright protection.[155] The same principle was shown to have guided Federal Agencies.[156]

The Board also only briefly entertained Dr. Thaler's policy argument that refusing to grant copyrights to AI-generated works would encourage people to fraudulently "claim authorship for work done by machines."[157] The scenario was deemed unlikely due to the deterrents that the Copyright Act already has in place against false misrepresentation.[158] Specifically, Section 506 of the Act explains that "knowingly mak[ing] a false representation of a material fact in the application for copyright registration" is an offense punishable by a fine of up to $2,500.[159]

Unsatisfied with the USCO's response, Dr. Thaler and his team sued.[160] The complaint reiterated that neither the Copyright Act nor case law support the USCO's finding that authors have to be human.[161] Dr. Thaler and Abbott argued that the Copyright Act was "intended to promote the creation of socially valuable works."[162] They noted how its purpose had been understood to include "afford[ing] greater encouragement to the

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[151] *Id.* at 1.

[152] *Id.* at 7.

[153] *See id.* at 2.

[154] Federal courts have exclusive subject matter jurisdiction over copyrights and patents. 28 U.S.C. § 1338(a).

[155] *See* Letter from Copyright Review Board to Ryan Abbott, *supra* note 13, at 3; *see* Burrow-Giles Lithographic Co. v. Sarony, 111 U.S. 53, 58 (1884) (interpreting "author" as "he to whom anything owes its orign [sic]; originator; maker; one who completes a work of science or literature").

[156] *See* Letter from Copyright Review Board to Ryan Abbott, *supra* note 13, at 5.

[157] *Id.* at 3 n.2 (quoting Letter from Ryan Abbott to U.S. Copyright Office (May 27, 2020), https://www.copyright.gov/ruling-filings/review-board/docs/a-recent-entrance-to-paradise.pdf [https://perma.cc/GFZ8-8XGQ]).

[158] *Id.*

[159] 17 U.S.C. § 506(e). Interestingly, since it is unlikely that an AI machine would notify the USCO of its status as the rightful author of a work that was claimed by someone else, it is not clear how the Office envisions identifying and punishing persons who infringe § 506(e) in this context.

[160] Complaint at 1, Thaler v. Perlmutter, No. 1:22-cv-01564 (D.D.C. June 2, 2022), ECF No. 1.

[161] *See id.* at 8–9.

[162] *Id.* at 17.

production of literary [or artistic] works of lasting benefit to the world."[163] Notably, they also highlighted how the rationale for granting copyright protection under the Intellectual Property Clause was "[n]ot primarily for the benefit of the author, but primarily for the benefit of the public."[164]

In a memorandum opinion dated August 18, 2023, the United States District Court for the District of Columbia denied Dr. Thaler's motion for summary judgment and sided with the USCO in holding that copyright law applies only to human-made works.[165] The decision, which the scientist promptly appealed,[166] recognized that the increased use of AI to generate artistic works will soon force the law into uncharted territories.[167] Nevertheless, the court declined to take the first step and, instead, reiterated that AI-generated works cannot be copyrighted.[168]

2. United Kingdom: Greenlight to Computer-Generated Works

Luckily for DABUS and Dr. Thaler, not all countries share the same attitude toward nonhuman-generated works. In the 1980s, the United Kingdom amended its copyright laws to grant protection to artistic works autonomously created by computers.[169] Specifically, the Copyright, Design and Patents Act includes a section about computer-generated works (CGWs), which are defined as works "generated by computer in circumstances such that there is *no human author* of the work."[170] Although the statute does not explicitly mention AI,

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[163] *Id.* (quoting Washingtonian Pub. Co. v. Pearson, 306 U.S. 30, 36 (1939)).

[164] *Id.* (quoting H.R. Rep. No 60-2222, at 7 (1909)).

[165] Thaler v. Perlmutter, No. CV 22-1564 (BAH), 2023 WL 5333236, at *1–2, 7 (D.D.C. Aug. 18, 2023).

[166] Notice of Appeal, Thaler v. Perlmutter, No. 1:22-cv-01564 (D.C. Cir. Oct. 10, 2023), ECF No. 26.

[167] *Thaler*, 2023 WL 5333236, at *13. This would not be the first time that new developments in technology and artistic expressions influenced changes in copyright law. *See* DAVID KLINE & DAVID KAPPOS, OPENSTAX, INTRODUCTION TO INTELLECTUAL PROPERTY 118 (2021), https://assets.openstax.org/oscms-prodcms/media/documents/Introduction_to_Intellectual_Property_2PYaEdp.pdf [https://perma.cc/A8JA-T9CF] ("Throughout the more than 226-year history of copyright in the United States, technological innovation and changes in consumer behavior have continuously forced Congress and the courts to embrace new forms of copyrighted media and new ways of distributing and consuming it.").

[168] *Thaler*, 2023 WL 5333236, at *14.

[169] *Artificial Intelligence Call for Views: Copyright and Related Rights*, U.K. INTELL. PROP. OFF., https://www.gov.uk/government/consultations/artificial-intelligence-and-intellectual-property-call-for-views/artificial-intelligence-call-for-views-copyright-and-related-rights [https://perma.cc/E9NS-NFKQ].

[170] Copyright, Designs and Patents Act 1988, c. 48, § 178 (UK) (emphasis added).

DABUS's works seem to squarely fit within the framework set out by the Act.

One caveat to the otherwise groundbreaking UK approach to CGWs is that the *legal* author of the work must still be human.[171] While this requirement might sound identical to the American human-authorship requirement, the two have far different implications. In the United States, the human-author requirement bars any creative work autonomously created by a machine from receiving copyright protection.[172] The US Copyright Act creates a conundrum where AI machines cannot be the legal authors of their creations because they are not human.[173] At the same time, their human owners cannot be the legal authors of the AI machine's creations without committing a crime.[174] Thus, in the United States, AI-generated works are unprotected by law and run the risk of becoming part of the public domain and freely available to anyone.[175]

On the other hand, in the United Kingdom, the human-legal-author requirement simply implies that the person who made the "arrangements necessary for the creation of the work" would be listed as its author.[176] Thus, while the legal author of DABUS's work would be Dr. Thaler, the artwork would nevertheless receive legal protection, unlike in the United States. As a CGW, the image would be protected by copyright for fifty years from its creation,[177] and its legal author would have most of the same rights as traditional human authors.[178]

The UK IPO's approach to copyright for computer-generated work aligns with the government's mission to make the United Kingdom a major player in the race for the

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[171] *Id.* § 9 ("In 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.").

[172] *See* U.S. COPYRIGHT OFF., *supra* note 125, § 306.

[173] *See* Letter from Copyright Review Board to Ryan Abbott, *supra* note 13, at 2 ("Courts interpreting the Copyright Act, including the Supreme Court, have uniformly limited copyright protection to creations of human authors.").

[174] *Id.* at 3 n.2; *see* 17 U.S.C. § 506(e).

[175] Jennifer Maisel, *Will Divergent Copyright Laws Between the US and UK Influence Where You Do Business as an Artificial Intelligence Company?*, JDSUPRA (Sept. 8, 2022), https://www.jdsupra.com/legalnews/will-divergent-copyright-laws-between-4352051/ [https://perma.cc/85D8-ZHWS].

[176] Copyright, Designs and Patents Act 1988, c. 48, § 9 (UK).

[177] *Id.* § 12. The same work generated solely by a human would receive copyright protection for the duration of the author's life plus seventy years from his or her death.

[178] Authors of CGWs do not enjoy the right to be identified as such in the circumstances mentioned in Section 77 of the Copyright, Design and Patents Act. *Id.* §§ 77–79.

advancement of AI.[179] Although the United Kingdom is currently not as economically strong as the United States when it comes to copyright, despite offering protection to computer-generated work,[180] the tables are bound to turn. As AI machines become more advanced and as more DABUS-like systems are created, society will likely experience a boom in AI-generated work. AI owners and investors will face the choice of expanding their business activities in the United States, where they would get no protection and no rights, or in the United Kingdom, where they would enjoy benefits similar to those granted to the authors of human-created works, including "revenue streams for dissemination (g. [sic], licensing)."[181] The choice appears easy.

3. Canada: New Hope in the "Co" Prefix

Although DABUS's artwork has not made its way to Canada,[182] its legal fight for authorship there would take yet another form. Until the end of 2021, the copyright framework in Canada was not much different from that of its North American neighbor's.[183] The Canadian Copyright Act also does not define "author," but courts have agreed it must be a human being.[184] However, in December 2021, the Canadian Intellectual Property Office (CIPO) granted a copyright for a painting titled *Suryast*.[185] The copyright listed two coauthors: Ankit Sahni, a human, and RAGHAV, an AI machine.[186] It is unclear how RAGHAV met the "author" requirement, but it appears that it did by virtue of its coauthor being human.[187] Although Dr. Thaler has not explained whether he would be satisfied being listed alongside DABUS as a coauthor, it would be peculiar to see the duo receive recognition in Canada and no recognition a few miles south.

The recent development in Canadian copyright does not provide definitive answers as to how CIPO might treat DABUS as a sole author, but it does leave the door open for revolutionary innovation to the country's legal framework. This development is consistent with the Canadian government's recent push for

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[179] *See Artificial Intelligence Call for Views: Copyright and Related Rights*, *supra* note 169.

[180] U.S. CHAMBER COM. GLOB. INNOVATION POL'Y CTR., *supra* note 116, at 68.

[181] Maisel, *supra* note 175.

[182] For updates on the copyright proceedings and applications filed by Dr. Thaler and his legal team, see *Copyright*, ARTIFICIAL INVENTOR PROJECT, https://artificialinventor.com/copyright/ [https://perma.cc/RK97-B7QV].

[183] *See* Medeiros et al., *supra* note 11.

[184] *Id.*

[185] *Id.*; Can. Copyright No. 1188619 (registered Dec. 1, 2021).

[186] *Id.*

[187] *See* Medeiros et al., *supra* note 11.

measures that would "support innovation and investment in AI" and create financial incentives for IP rights holders to develop creative works and inventive products in Canada.[188]

C. Patent: The DABUS Case Study

A few years after its initial success as an artist, DABUS expanded its repertoire. This time, the AI autonomously developed two inventions: a food and liquids container and a light beacon.[189] The container features "pits and bulges in [its] profile," which improve grip and can be used to link together multiple containers.[190] The light beacon uses a light pulsating at a specific frequency to "attract[] enhanced attention" from people in case of emergency when "potentially-competing attention sources" are present.[191]

With DABUS now acting as an inventor, it did not take long for Dr. Thaler and his legal team to spring into action in the patent arena.[192] However, while the inventions clearly represented the type of "new and useful process[es] [and] machine[s]" the Patent Act traditionally intended to protect,[193] their listed inventor—DABUS—proved far less conventional.[194] Although Dr. Thaler's patent efforts have targeted eighteen countries, this section focuses only on five: the United States, the United Kingdom, Canada, Australia, and South Africa. A comparison of the DABUS test case in these countries highlights differences not only between countries, but also among the attitudes within the same country with respect to patents versus copyrights.

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[188] David Yi and Maya Medeiros, *IP Monitor: Government of Canada Initiates Consultation on Modernizing Copyright Framework for Artificial Intelligence and the Internet of Things*, NORTON ROSE FULBRIGHT (July 2021), https://www.nortonrosefulbright.com/en-ca/knowledge/publications/5d9eb6ca/ip-monitor-government-of-canada-initiates-consultation-on-modernizing-copyright-framework [https://perma.cc/69SN-89MD].

[189] *Patents and Applications*, *supra* note 18.

[190] *Id.*

[191] *Id.*

[192] For a list of the patent applications filed by Dr. Thaler and his legal team, see *id.*

[193] 35 U.S.C. § 101.

[194] *See* Laura Butler, World First Patent Applications Filed for Inventions Generated Solely by Artificial Intelligence, UNIV. OF SURREY (Aug. 1, 2019), https://www.surrey.ac.uk/news/world-first-patent-applications-filed-inventions-generated-solely-artificial-intelligence [https://perma.cc/AT6T-8FZN].

1. United States: Another Knockout for DABUS

In 2019, Dr. Thaler filed an application with the USPTO seeking to patent DABUS's inventions.[195] Like with his copyright application, the scientist listed DABUS as the inventor and himself as the assignee.[196] After a series of pushbacks from the USPTO over whether the application identified an inventor, the office ultimately refused to grant the patents.[197] The USPTO patent commissioner's rationale focused mainly on statutory interpretation, which, in this case, was made easier by the Patent Act itself defining "inventor" as an "individual."[198] Years of case law and USPTO regulations further supported this meaning.[199] Additionally, Dr. Thaler's policy argument that granting patents to AI would encourage innovation and deter fraudulent applications was deemed insufficient to "overcome the plain language of the patent laws as passed by the Congress and as interpreted by the courts."[200]

Unsurprisingly, Dr. Thaler and his team again sued the USPTO seeking review of its decision.[201] The district court sided with the USPTO and reasoned that the Patent Act's language unmistakably required inventors to be human.[202] The court also echoed the USPTO's comment that Dr. Thaler's policy arguments were ultimately unsuccessful against the clear words of the statute.[203] On appeal, the Federal Circuit unanimously affirmed the lower court's decision, providing the same rationale.[204]

Dr. Thaler and his team promptly filed a petition before the full Federal Circuit.[205] The scientist explained the significance of the subject matter and noted that neither the district court nor the USPTO had disputed the fact that

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[195] *In re* Application of Application No. 16/524,350, 2020 Dec. Comm'r Pat. 1, https://www.uspto.gov/sites/default/files/documents/16524350_22apr2020.pdf [https://perma.cc/XA88-CNS7].

[196] *Id.* As "assignee," Dr. Thaler would be the legal owner of the patents. Vic Lin, *Who Owns the Patent Rights (Patent Owner vs. Applicant vs. Assignee)?*, PAT. TRADEMARK BLOG, https://www.patenttrademarkblog.com/who-owns-patent-rights-who-is-patent-owner/ [https://perma.cc/RS2P-U6DX] ("A patent assignment is a simple document where each inventor acknowledges that the patent application belongs to someone else.").

[197] *In re* Application of Application No. 16/524,350, 2020 Dec. Comm'r Pat. 2.

[198] *See id.* at 4 (quoting 35 U.S.C. § 100(a)).

[199] *See id*. at 4–6.

[200] *Id.* at 7.

[201] Thaler v. Hirshfeld, 558 F. Supp. 3d 238, 245–48 (E.D. Va. 2021).

[202] *Id.*

[203] *Id.* at 248.

[204] *See* Thaler v. Vidal, 43 F.4th 1207, 1213 (Fed. Cir. 2022).

[205] *See* Corrected Combined Petition for Panel Rehearing and Rehearing En Banc, Thaler v. Vidal, 43 F.4th 1207 (Fed. Cir. 2022).

DABUS had, in fact, invented the inventions listed in the patent applications.[206] Dr. Thaler argued that the acknowledgment that AI machines could autonomously invent, coupled with the recent interest that the topic had generated in and out of courts, deserved "more than a cursory look at 'plain language.'"[207] Unfortunately, the Federal Circuit disagreed and denied both petitions.[208]

Hoping for a more open-minded audience, Dr. Thaler and his team filed a petition for a writ of certiorari with the Supreme Court.[209] The petition, which echoed the arguments set out in the petitions for the Federal Circuit,[210] was met with support by academics and patent attorneys alike. The amicus briefs filed explained the foreseeable negative consequences of the lower court decision and urged the Court to grant certiorari in light of the exceptional importance of the topic.[211] Yet, despite the many persuasive arguments presented, the Supreme Court denied Dr. Thaler's petition.[212] With its nonappealable decision, the Court effectively put an end to Dr. Thaler's fight on US soil. It is now Congress's decision whether to amend the law to provide patent protection to AI-generated inventions in an effort to "help the US maintain its position as a world leader in innovation."[213]

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[206] *Id.* at 12.

[207] *Id.* at 13–15.

[208] Christina Tabacco, *Mandate Issues in AI-Developed Technology Patent Dispute After Fed Cir. Denies Rehearing*, L. STREET (Oct. 28, 2022), https://lawstreetmedia.com/news/tech/mandate-issues-in-ai-developed-technology-patent-dispute-after-fed-cir-denies-rehearing/ [https://perma.cc/5US6-TPJF].

[209] *See* Petition for Writ of Certiorari, Thaler v. Vidal, 143 S. Ct. 1783 (2023) (No. 22-919).

[210] *See generally id.* (explaining that the language of the Patent Act does not preclude AI from being inventors and that the importance of the question presented warrants further judicial review).

[211] Professor Lessing and his colleagues argued that the Federal Circuit failed to take into account the impact that AI-generated inventions have on the US economy and instead handed down a decision that inevitably "disincentivizes AI investment, hindering the development of science and useful arts, and ultimately affecting public welfare and the innovation-reliant U.S. economy." Brief for Lawrence Lessig, et al. as Amici Curiae Supporting Petitioner at 10–17, Thaler v. Vidal, 143 S. Ct. 1783 (2023) (No. 22-919). Similarly, the author and her law school colleagues argued that the Federal Circuit's decision would have a chilling effect on AI development in direct conflict with recent efforts by Congress and the executive branch to maintain the United States' hegemony in the field. *See* Brief for Brooklyn Law Incubator & Policy (BLIP) Clinic and Prof. Dr. Peter Georg Picht as Amici Curiae Supporting Petitioner at 5–19, *Thaler*, 143 S. Ct. 1783 (2023) (No. 22-919). The Chicago Patent Attorneys also highlighted the risk that not granting patents to AI-generated inventions will lead companies not to disclose their inventions, thus harming the US scientific field and overall societal wellbeing. *See* Brief for The Chicago Patent Attorneys as Amici Curiae Supporting Petitioner at 9–13, *Thaler*, 143 S. Ct. 1783 (2023) (No. 22-919).

[212] *Thaler*, 143 S. Ct. at 1783.

[213] Ryan Abbott (@profabbott), LINKEDIN (Apr. 24, 2023), https://www.linkedin.com/feed/update/urn:li:activity:7056323319918125057/ [https://perma.cc/S82S-8EFS].

2. United Kingdom: Same Country, Different Attitude

Despite the United Kingdom's longstanding willingness to grant copyright protection to computer-generated work, its current form of patent protection does not go as far.[214] When faced with DABUS's applications, the UK IPO conceded that AI-generated inventions "are likely to become more prevalent in [the] future" and that there will be a need to consider how such inventions will fit in the patent framework.[215] However, at the same time, the IPO determined that the current framework could not be forced to account for these inventions when it was not intended to do so.[216] DABUS, it argued, could not be considered an inventor under the Patent Act because only a natural person could be.[217] Further, it determined that Dr. Thaler's status as DABUS's owner did not grant him the right to apply for patents, leaving DABUS's inventions unprotected by UK patent law.[218]

Dr. Thaler challenged the UK IPO's decision in court, where he was again met with a series of refusals. The High Court ruled in favor of the UK IPO, mostly based on statutory interpretation.[219] The court unanimously held that the Patent Act supported the IPO's conclusion that only a natural person could be an inventor and that Dr. Thaler did not have the right to apply for the patents.[220] Notably, Justice Smith admitted that

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[214] In 2021, the UK IPO launched a consultation seeking experts' opinions on issues concerning the intersection of AI and IP. While the option of allowing AI machines to be the inventors of patents was brought up by some respondents, the UK IPO ultimately concluded that "AI is not yet advanced enough to invent without human intervention." *Artificial Intelligence and Intellectual Property: Copyright and Patents: Government Response to Consultation*, U.K. INTELL. PROP. OFF., https://www.gov.uk/government/consultations/artificial-intelligence-and-ip-copyright-and-patents/outcome/artificial-intelligence-and-intellectual-property-copyright-and-patents-government-response-to-consultation [https://perma.cc/2C29-DR4N].

[215] U.K. INTELL. PROP. OFF., DECISION BL O/741/19 (Dec. 4, 2019), ¶ 29.

[216] *Id.* ("It is right that this is debated more widely and that any changes to the law be considered in the context of such a debate, and not shoehorned arbitrarily into existing legislation.").

[217] *Id.* ¶ 18, 20.

[218] *Id.* ¶ 23.

[219] Thaler v. Comptroller-Gen. of Patents, Designs and Trade Marks [2020] EWHC (Ch) 2412 [24]–[50] (Eng.).

[220] *Id.* at [39]–[49] (Eng.); Patents Act 1977, c. 37 § 13 ("[A]n applicant for a patent shall . . . file with the Patent Office a statement (a) identifying the *person or persons* whom he believes to be the inventor or inventors; and (b) where the applicant is not the sole inventor or the applicants are not the joint inventors, indicating the derivation of his or their right to be granted the patent.") (emphasis added); *id.* § 7 ("A patent for an invention may be granted (a) . . . to the inventor . . . ; (b) . . . to any person . . . who, . . . by virtue of an enforceable term of any agreement entered into with the inventor before the making of the invention, was or were at the time of the making of the invention entitled to the whole of the property in it.").

his role was "to construe and not to re-write" the law and seemed to endorse the IPO's view that "questions of how the law *should be,* rather than [how to] apply[] the law *as it is*" are more suitable for the legislature than the courts.[221]

On appeal, a partially divided Court of Appeal ultimately reached the same conclusion as the High Court. While all three justices agreed that the Patent Act required an inventor to be a natural person,[222] there was a disagreement as to whether Dr. Thaler should be granted a patent.[223] One justice asserted that the scientist should be granted a patent as DABUS's inventor, owner, and operator.[224] The other justices rejected this argument.[225]

Likely due to the disagreement among the justices, the UK Supreme Court granted Dr. Thaler's leave to appeal and held a hearing on March 2, 2023.[226] At the hearing, Dr. Thaler's legal team argued that the language of the Patent Act required inventors to be the "actual deviser[s]" of their inventions and did not specify that they had to be human beings.[227] The attorneys also interpreted the statutory "requirement to 'identify the person or persons' believed to be the inventor" not to imply that inventors must be human, but simply that they should be identified when they are.[228] Although it is hard to say whether the Lords were persuaded by these arguments, the Court recognized the importance and novelty of the issue.[229]

3. Canada: A Sliver of Hope

Similar to the United Kingdom, Canada's recent open-mindedness toward AI-generated artwork has not extended to patents. When presented with DABUS's applications, CIPO

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[221] *Thaler*, EWHC (Ch) 2412 at [22] (emphasis added); *see id.* at [23].

[222] Mike Williams & Lara Sibley, *DABUS—Appeal to the UK Supreme Court Allowed*, MARKS & CLERK (Sept. 7, 2022), https://www.marks-clerk.com/insights/news/dabus-appeal-to-the-uk-supreme-court-allowed/ [https://perma.cc/P82Q-RGC6].

[223] *Id.*

[224] Thaler v. Comptroller-Gen. of Patents, Designs and Trade Marks [2021] EWCA (Civ) 1374 [79] (Eng.) ("Just because all inventors are people, this case demonstrates that it does not follow that all inventions have a person who invented them.").

[225] *Id.* at [137].

[226] *See* Williams & Sibley., *supra* note 222; *see Thaler (Appellant) v Comptroller-General of Patents, Designs and Trademarks (Respondent)*, U.K. SUP. CT., https://www.supremecourt.uk/cases/uksc-2021-0201.html [https://perma.cc/NC9E-HXNJ].

[227] Robert Dickens, *UK Supreme Court Considers Whether AI Can Be an Inventor of a Patent*, ALLEN & OVERY (Mar. 6, 2023), https://www.allenovery.com/en-gb/global/blogs/digital-hub/uk-supreme-court-considers-whether-ai-can-be-an-inventor-of-a-patent [https://perma.cc/2MRF-5PCW].

[228] *Id.* (citing Patent Act 1977, c. 37 § 13).

[229] *See id.*

"issued a non-compliance notice," arguing that a machine could not "have rights under Canadian law or . . . transfer those rights to a human."[230] However, not all hope is lost. CIPO granted Dr. Thaler permission to "submit[] a statement on behalf of the AI machine and identify . . . himself as [its] legal representative."[231] This permission seems to indicate that CIPO may be willing to allow an AI machine to be the inventor, as long the applicant is human.[232]

4. Australia: A Short-Lived Win

While the United States and the United Kingdom consistently rejected Dr. Thaler's applications and arguments, Australia toyed with the scientist's hopes before landing a final blow against his application. In its initial decision, the Australian Patent Office rejected DABUS's applications, concluding that the Patents Act did not allow an AI machine to be an inventor.[233] The Act specifies that "a patent for an invention may only be granted to a person who: (a) is the inventor; or (b) would . . . be entitled to have the patent assigned to the person; or (c) derives title to the invention from the inventor."[234] According to the APO, since DABUS was not a person, it did not qualify as an inventor under (a), nor did it have the legal rights to transfer the patent under (b) and (c).[235]

Following his usual *modus operandi*, Dr. Thaler sued the Commissioner of Patents. This time, however, in an unprecedented legal decision, the Federal Court of Australia sided with the scientist.[236] Justice Beach provided three reasons why the APO had erred in its determination.[237] First, he argued that the term "inventor" is an "agent noun" and, as such, could refer to "a person or thing that invents."[238] Second, he pointed to the existence of many patentable inventions that could not sensibly be said to have

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[230] William Chalmers David Li, & Maya Madeiros, *IP Monitor: AI Inventorship on the Horizon: DABUS Comes to Canada!*, NORTON ROSE FULBRIGHT (Feb. 1, 2022), https://www.nortonrosefulbright.com/en-ca/knowledge/publications/5881ba46/ai-inventorship-on-the-horizon-dabus-comes-to-canada [https://perma.cc/2VNP-DUH2].

[231] *Id.*

[232] *Id.*

[233] Stephen L. Thaler [2021] APO 5; 162 IPR 381 (Austl.).

[234] *Patents Act 1990* (Cth) ch 2 s 15 (Austl.).

[235] Stephen L. Thaler [2021] APO 5; 162 IPR 381 (Austl.) ("It is an uncontroversial observation that the law does not presently recognise the capacity of an artificial intelligence machine to assign property.").

[236] *Thaler v Comm'r of Pat.* [2021] FCA 879 (30 July 2021) 2 (Austl.).

[237] *Id.*

[238] *Id.*

a human inventor.[239] Third, he found that the Patents Act did not prevent AI machines from being inventors.[240]

The court argued that Section 15 of the Act did not preclude the finding that DABUS was the inventor.[241] Justice Beach noted that the Commissioner of Patents had confused "the question of ownership [of a patent] . . . with the question of who can be an inventor."[242] Dr. Thaler never claimed that DABUS was entitled to patent ownership and never challenged the idea that the owner of a patent must be a human being or legal entity.[243] The scientist simply claimed that "[a]n inventor may be an artificial intelligence system," and the court agreed.[244]

While significant, Dr. Thaler's victory in Australia was short lived. On appeal, the Full Court of the Federal Court reversed the lower court decision and held that only humans could be considered inventors.[245] The five judge panel held that the term "inventor," while left undefined in the Patents Act, had long been understood to carry its ordinary English meaning of "the person(s) responsible for making the invention."[246] Additionally, the panel disagreed with Justice Beach's interpretation of Section 15 of the Patents Act and held that the section implied the need for "a legal relationship between the actual inventor and the person first entitled to the grant."[247] DABUS, as a machine, lacked the ability to enter into legal relationships, thus making it impossible to reconcile Section 15 with the Justice's argument.

The Full Court did recognize the importance of Dr. Thaler's mission to generate a discussion surrounding AI's role within the patent framework.[248] However, it argued that courts should refrain from reading policies they find desirable into statutory frameworks where such policies do not appear.[249]

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[239] *Id.* Justice Beach focused on AI's role in the pharmaceutical industry and listed some of the discoveries and innovations made possible thanks to AI, such as the development of new drugs. *See id.* at 9–12.

[240] *Id. at* 1–2.

[241] *Id.* at 31–37 ("Generally, on a fair reading of ss 15(1)(b) and 15(1)(c), a patent can be granted to a legal person for an invention with an artificial intelligence system or device as the inventor.").

[242] *Id.* at 2.

[243] *See* Abbott, *supra* note 32, at 14 (explaining that an AI machine cannot legally own property).

[244] *Thaler v Comm'r of Pat.* [2021] FCA 879 (30 July 2021) 2 (Austl.).

[245] *Comm'r of Pat. v Thaler* [2022] FCAFC 62 (13 Apr. 2022) 1 (Austl.).

[246] *Id.* at 27.

[247] *Id.* at 29.

[248] *Id.* at 31.

[249] *Id.* at 32 ("[T]he Court must be cautious about approaching the task of statutory construction by reference to what it might regard as desirable policy, imputing

Ultimately, the panel of judges unanimously agreed that Justice Beach had erred in his decision and reinstated the Deputy Commissioner's orders.[250]

The final blow arrived on November 11, 2022, when the Australian High Court rejected Dr. Thaler's application to appeal the judgment of the Full Court.[251] After hearing both parties' arguments, the Justices ultimately held that the Court was "not the appropriate vehicle to consider the questions of principle" raised by Dr. Thaler.[252] With this decision, Australia became the first jurisdiction "to issue a final, non-appealable denial" to DABUS's claims.[253]

5. South Africa: Victory at Last

Dr. Thaler finally obtained respite in South Africa, which became the first—and so far, only—country to grant a patent to an AI machine.[254] The triumph was possibly due to the lenient procedures that South Africa's Patent Office adopts when examining patent applications.[255] However, given the country's recent patent reform and overall policy environment aimed at "increas[ing] innovation to solve the country's socioeconomic issues," it is possible that the CIPC knew exactly what it was doing.[256]

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that policy to the legislation, and then characterising that as the purpose of the legislation.").

[250] *Id.*

[251] *See* Ryan Abbott (@profabbott), LINKEDIN (Nov. 14, 2022), https://www.linkedin.com/feed/update/urn:li: activity:6996728080488693760/ [https://perma.cc/7JCE-8AJQ]. The High Court of Australia is the highest court in Australia and hears appeals from the appellate superior courts, including the Full Court of the Federal Court. *See Role of the High Court*, HIGH CT. OF AUSTL., https://www.hcourt.gov.au/about/role-of-the-high-court [https://perma.cc/S5MK-KCNT].

[252] *Thaler v Comm'r of Pat.* [2022] HCATrans 199 1, 16 (Austl.).

[253] Ryan Abbott (@profabbott), *supra* note 251.

[254] Meshandren Naidoo, *In a World First, South Africa Grants a Patent to An Artificial Intelligence System*, QUARTZ AFRICA (Aug. 9, 2021), https://qz.com/africa/2044477/south-africa-grants-patent-to-an-ai-system-known-as-dabus/ [https://perma.cc/7GB8-5PMA].

[255] *Id.* ("This requires a check box sort of evaluation: ensuring that all the relevant forms have been submitted and are duly completed.").

[256] *Id.* CIPC has not explained its rationale for granting DABUS's patent applications, but, in recent years, South Africa has taken several steps to strengthen its AI footprint. *See, e.g.*, Letlhokwa Mpedi, Tinyiko Maluleke, Tshilidzi Marwala, & Khumbudzo Ntshavheni, *South Africa's New National Artificial Intelligence Institute Can Help Transform our Economy*, UNIV. JOHANNESBURG (Dec. 6, 2022), https://www.uj.ac.za/news/south-africas-new-national-artificial-intelligence-institute-can-help-transform-our-economy/ [https://perma.cc/PNZ7-T4QH].

D. The Global Future of AI and IP

The central issue surrounding AI-generated works and inventions lies in the definitions that legislators and courts have given to "authors" and "inventors." Unsurprisingly, those definitions are at the heart of the solution for many. Scholars who wish to maintain the copyright and patent status quo have urged IP Offices and courts not to broaden the existing definition of authors and inventors to include AI.[257] At the opposite end of the spectrum, supporters of AI-friendly IP reforms have argued that the terms should be amended to recognize AI machines as the inventors and authors of their products.[258]

Despite what might seem like a nearly worldwide defeat, Dr. Thaler has undoubtedly succeeded in his goal: people are talking about the inadequacy of IP laws with respect to AI-generated works. At the outset, courts and IP Offices were asked whether AI-generated works and inventions *could* receive IP protection under the current laws. Despite Dr. Thaler's efforts, the answer was negative almost everywhere. The question then became, *should* AI-generated works and inventions receive IP protection?

IV. A NEW FRONTIER OF IP PROTECTION: DIGIWORKS RIGHTS

This note joins the voices of the legal scholars who argue that AI-generated works and inventions should receive IP protection, but with a twist. Given the inevitable advance of science and the increasingly more prominent role that AI will have on IP, it is imperative for patent and copyright laws to account for that. At the same time, it is equally important to safeguard human authors and inventors. Luckily, these considerations are not mutually exclusive and can both be satisfied by the introduction of Digiwork rights.

A. Defining Digiworks

Rather than trying to forcefully fit AI into a space it was not intended to occupy, Congress should create a new space specifically for AI-generated works. By virtue of its power "[t]o promote the [p]rogress of [s]cience and useful [a]rts," Congress should establish a new "type" of IP as a subcategory of both patent and copyright that only applies to AI machines and their

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[257] *See* U.S. PAT. & TRADEMARK OFF., PUBLIC VIEWS ON ARTIFICIAL INTELLIGENCE AND INTELLECTUAL PROPERTY POLICY 3–6, 18 (2020).

[258] Carnochan Comer, *supra* note 94, at 471–72.

outputs.[259] These new subcategories, to be called Digiwork patent and Digiwork copyright, would present some similarities with "standard" patents and copyrights, such as the subject matter and the process for obtaining them. However, the major difference would be that the *source* of the work would be required to be an AI machine.

While the focus of Digiwork rights is on AI, humans would still play a significant role in this framework. Ultimately, the owner of a Digiwork patent or Digiwork copyright would be a human being. The owner of an AI machine would automatically qualify to become the owner of the Digiwork right obtained for the output the AI produced. In the event that the output was commissioned by a third party, the work-for-hire doctrine would apply,[260] and whoever commissioned the output would become the owner of its respective Digiwork right.[261]

Another meaningful shift that Digiwork rights would implement is a shorter duration of protection. Where patents for human inventors are granted for twenty or fifteen years from their filing date,[262] Digiwork utility patents would only last for ten years, and Digiwork design patents for seven. Similarly, where copyrights for human authors are granted for the author's lifetime plus seventy years,[263] Digiwork copyright would only last seventy years.

B. Alternative Approaches and Why They Fail

The Digiwork framework is not the only possible approach to address AI-generated IP. In 2019, the USPTO issued a request for comments "on patenting artificial intelligence inventions."[264] It later circulated a second request for comments on the impact of AI on other types of IP, such as copyright.[265] The answers it received delineated a strong preference for maintaining the current status quo, with a

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[259] U.S. CONST. art. I, § 8, cl. 8.

[260] 17 U.S.C. § 101.

[261] Even in the case of a work-for-hire, a Digiwork copyright would last seventy years from the creation of the work and a Digiwork patent would last ten or seven years from the date it is granted.

[262] 35 U.S.C. §§ 154, 173.

[263] 17 U.S.C. § 302.

[264] Request for Comments on Patenting Artificial Intelligence Inventions, 84 Fed. Reg. 44889 (Aug. 27, 2019).

[265] Request for Comments on Intellectual Property Protection for Artificial Intelligence Innovation, 84 Fed. Reg. 58141 (Oct. 30, 2019).

majority of commenters arguing that current laws are already equipped to deal with the issue of AI-generated IP.[266]

Other than the status quo approach that emerged from the USPTO's survey, two others seem possible. The first is Canada's copyright approach, which would grant AI machines the status of coauthors and coinventors.[267] The second is South Africa's, which controversially proposes recognizing AI machines as "the sole inventor[s] [or authors] of [their] . . . works."[268]

1. The Status Quo Approach

The approach that has garnered the most support in the United States calls for Congress, IP Offices, and courts to maintain the current laws and continue denying authorship and inventorship status to AI.[269] While this approach would obviously be the easiest to implement, it would lead to the most undesirable consequences.

The status quo approach would ultimately force AI owners to choose between potentially losing their work to the public domain or fraudulently claiming authorship or inventorship of their AI's work. Additionally, this approach would likely hold the United States back in the race for technological advancement by delaying the development of discoveries, such as new drugs or other useful technologies, that could benefit society as a whole. This is because individuals could be discouraged from developing the means for these discoveries due to the lack of copyright or patent protection. Depending on how AI friendly other countries will become, the status quo approach could also harm the economy of the United States by pushing tech companies and investors to move their businesses elsewhere.[270]

2. The Canadian Approach

The Canadian approach would enable IP offices to grant AI machines coauthor and coinventor status. At the outset, this

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[266] *See* U.S. PAT. & TRADEMARK OFF., *supra* note 257, at 3–6. "The vast majority of commenters acknowledged that existing law does not permit a nonhuman to be an author . . . [and] they also responded that this should remain the law." *Id.* at 20–21.

[267] Carnochan Comer, *supra* note 94, at 471; *see supra* Section III.B.3.

[268] Carnochan Comer, *supra* note 94, at 470; *see supra* Section III.C.5.

[269] U.S. PAT. & TRADEMARK OFF., *supra* note 257, at 3–6, 18.

[270] *See generally* Maisel, *supra* note 175 (explaining that the legal implication related to the treatment of AI might be a factor for companies in deciding where to conduct their business).

system looks like a major victory for team AI. However, this approach has a major flaw. Recognizing that an AI machine can be a coauthor or a coinventor necessarily implies that AI machines can be authors and inventors. Thus, this approach would instruct IP offices to recognize—albeit in a circuitous way—that AI *can* be authors and inventors. At the same time, however, courts would still have to abide by current IP laws that state AI *cannot* be authors and inventors.[271]

The implementation of the Canadian approach would ultimately lead to more confusion than it would solve, not to mention that it is unclear whether courts would even find these types of patents and copyright to be valid. Alternatively, this framework would require Congress to amend the language of the Copyright Act and Patent Act to reflect this shift, at which point the Canadian approach would encounter the same issues as the South African one.[272]

3. The South African Approach

The last possible alternative approach calls to allow AI machines to receive author and inventor status. This approach arguably has considerable benefits but also severe downsides. Among its benefits is the likely boost to technological advancement that would follow the implementation of this new framework. Scientists like Dr. Thaler would be incentivized to develop increasingly advanced machines, and companies would be equally incentivized to obtain and use such technology because they would receive legal protections for the findings of their AI. As machines become more sophisticated, their outputs would likely improve as well. This would result in the development of innovative products and ideas that would, in turn, stimulate the economy and benefit society.

But expanding the definition of author and inventor to include AI would nevertheless have some negative consequences. First, implementing the new system would be considerably complicated. Substantial sections of the Patent Act and Copyright Act would need to be amended, and new rules and guidelines would have to be produced. A radical departure from the status quo would also severely undermine century-long

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[271] Unsurprisingly, CIPO has yet to explain how it reconciled its recent approach to AI-generated art with Canadian IP jurisprudence. *See* Medeiros et al., *supra* note 11. CIPO has not released an explanation for its decision to grant coauthorship status to RAGHAV, despite Canadian jurisprudence holding that only human beings can be authors.

[272] *See infra* Section IV.B.3.

jurisprudence on which courts have consistently relied and would also overturn several seminal IP cases.

Second, the South African approach would harm human authors and inventors. Obtaining authorship and inventorship status means more than identifying the origin of a creative work or invention; it recognizes and celebrates the hard work and dedication that made them possible. Granting the status of author and inventor to AI machines undermines the titles themselves, as it equates a person who spent their life studying or perfecting a skill to a machine that obtained the same knowledge in a two-minute update.

Third, this approach could redirect funds and work opportunities from human authors and inventors to AI developers. Companies and investors might prefer to finance AI machines that are likely to produce mistake-free valuable outcomes in a short amount of time rather than human beings who might require decades of trial-and-error to achieve a less optimal product. Additionally, besides being faster and more accurate, DABUS-like AI machines could likely simultaneously perform the work of many human authors and inventors. Employers and investors would be able to choose between employing one machine for all of their needs or a team of artists and scientists. From a financial perspective, the choice seems easy. The working conditions of AI compared to human beings would also skew investments and work opportunities toward machines, as AI systems could work tirelessly with no need for breaks, vacations, or sick days. Thus, after pitting machines against people, the South African approach would ultimately crown machines as the winner.

C. The Benefits of the Digiwork Framework

Adopting the Digiwork framework would ultimately achieve the same benefits of the South African approach while limiting its negative consequences. Notably, Digiwork patents and copyrights would use the term "*source*" in place of "author" and "inventor." This linguistical choice would preserve the meaning of the terms and safeguard their honorific status. Digiwork rights would continue to emphasize the intrinsic value of human authorship and inventorship, and the significance of these titles would not be diluted.

By reducing the duration of the protection granted to AI-generated IP, Digiwork framework provides an additional safeguard for human authors and inventors. Where the South African approach would leave authors and inventors to compete

with AI for funds and sponsorship, the Digiwork approach would encourage investors to keep supporting human authorship and inventorship in order to benefit from longer IP protection.

While the proposed duration for Digiwork rights might not seem much shorter than that of traditional patents and copyrights, its reduced length would have a significant impact. The benefit of obtaining IP protection in the first place rests on an applicant's ability to enjoy and exploit a commercial monopoly for a certain amount of time.[273] The longer the monopoly, the bigger the benefit. By ensuring that human-generated works receive a considerably longer monopoly than AI-generated ones, Digiwork guarantees that the bigger benefit will remain with human authors and inventors.

Implementing the Digiwork framework would also preserve the century-long jurisprudence on authorship and inventorship that the Canadian and South African approaches would obliterate.[274] Since the answer to the question of who can be an author or an inventor would remain unchanged, the cases that have dealt with these issues would remain good law. Judges could continue to rely on the same legal theories they have used for hundreds of years when faced with future cases involving human authors and inventors. At the same time, they would have the chance to refine the new Digiwork system, starting from a clean slate.

A possible criticism of the Digiwork framework is that its implementation would nevertheless require a significant reform of current laws and regulations. While the new system would likely require considerable efforts by Congress, the USPTO and USCO, and the courts, its execution would not be as burdensome as it might seem. Since the system purports to add a new subcategory of IP rather than amending the existing ones, Congress would not have to revise most of the Patent Act and Copyright Act. Instead, it would only have to add new sections to account for the unique characteristics of Digiwork, such as the AI-source requirement, ownership requirement, and reduced duration. Similarly, IP Offices would not have to drastically change their rules and guidelines; they would simply have to include new instructions on how to handle AI-generated works.

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[273] *See* Carnochan Comer, *supra* note 94, at 475; *see* Elle Mahdavi, *Patents and the Pharmaceutical Industry*, CAL. REV. MGMT. (May 26, 2017), https://cmr.berkeley.edu/blog/2017/5/patents-and-pharmaceuticals/ [https://perma.cc/E4XH-K9HD] (providing an example of the importance of the duration of a patent for companies and investors).

[274] *See supra* Part II.

Although not bulletproof, the Digiwork framework would achieve the economic and social benefits that are only possible if AI-generated works are granted IP recognition. At the same time, Digiwork rights would circumvent many of the issues with other approaches and would hopefully prove more palatable for Congress to approve.

CONCLUSION

Despite the somewhat popular fear that machines will one day rise and turn on humankind, it appears that, for now, the biggest issue faced is whether the outputs of these machines will receive IP protection. The shockwave that Dr. Thaler and his team generated in the IP community demonstrated that the current patent and copyright frameworks are not reconcilable with AI-generated works, while also highlighting the need for comprehensive legal reform.

While many scholars have proposed solutions that lay at the extremes of what could be done—completely changing the system or not changing it at all—the best solution is in the middle.[275] Rather than forcefully fitting AI into the existing patent and copyright frameworks, Congress should instead grant it a framework of its own. By creating a subcategory of patents and copyrights—Digiwork rights—that only applies to works generated by AI sources, Congress would avoid "devaluing the meaning" of inventorship and authorship.[276] At the same time, it would provide strong incentives for "businesses to invest in developing inventive AI systems."[277]

Not long ago, the idea of machines autonomously creating art and discovering new inventions sounded like a science-fiction fantasy. Yet, it has now become a reality. Dr. Thaler and his team set out on a global quest to foster a conversation about the positive impact of AI on society and the need for legal reform to account for AI-generated IP.[278] The dialogue that ensued unveiled that most countries, including the United States, are currently not equipped for what is to come. Nevertheless,

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[275] *Compare* U.S. PAT. & TRADEMARK OFF., *supra* note 257, at 3–6, 20–21 (explaining that most commenters argued that nonhumans should not be allowed to be authors and inventors), *with* Carnochan Comer, *supra* note 94, at 472–80 (arguing that AI machines should be allowed to be inventors).

[276] Macaulay, *supra* note 34.

[277] *Id.*

[278] ARTIFICIAL INVENTOR PROJECT, https://artificialinventor.com/ [https://perma.cc/V9XU-LG4B].

progress does not wait for people to be ready. DABUS may be set to lose its fight, but "[t]he [AI] battle has just begun."[279]

Sofia Vescovo[†]

[279] TERMINATOR 3: RISE OF THE MACHINES (Warner Bros. Pictures 2003, 1:41:42).

[†] J.D. Candidate, Brooklyn Law School, 2024; B.S. John Jay College of Criminal Justice – CUNY, 2020. Thank you to the *Brooklyn Law Review* editors and staff for all of their hard work to make this publication possible, with special thanks to Rebeka Cohan, Matthew Gilligan, and Allison Toner for dealing with my inability to put the pen down. Thank you also to all of my friends, who, by now, know more about AI and IP than they ever cared for. Finally, un grazie speciale ai miei genitori e al resto della mia famiglia, whether by blood or by choice, for always supporting me and making my accomplishments possible.