

Mr. Andrei Iancu,
Under Secretary of Commerce for Intellectual Property and Director of the United States Patent and Trademark Office

RE: Request for Comments on Intellectual Property Protection for Artificial Intelligence Innovation (Federal Registry Notice 84 FR 58141)

Dear Mr. Iancu:

We write in response to the U.S. Patent and Trademark Office's (USPTO) request for comments into the impact of artificial intelligence (AI) technologies on intellectual property law and policy. The Information Technology and Innovation Foundation (ITIF) comments draw on prior research about the critical role of intellectual property plays in spurring innovation, such as in the ITIF report "IP Protection in the Data Economy: Getting the Balance Right on 13 Critical Issues."

The Information Technology and Innovation Foundation is a non-profit, non-partisan public policy think tank focusing on a host of critical issues at the intersection of technological innovation and public policy. Its mission is to formulate and promote policy solutions that accelerate innovation and boost productivity to spur growth, opportunity, and progress.

Sincerely,

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OVERVIEW

Intellectual property (IP) is based on the idea that those who combine the spark of imagination with the grit and determination to see their vision become reality in books, technology, medicines, designs, sculpture, services, and more deserve the opportunity to reap the benefits of their innovation—and that this reward incentivizes more creative output. In the past, all works were entirely created by people. However, the advent of artificial intelligence (AI) has raised the prospect that some works are now the direct output of computer systems, including some operating autonomously. U.S. policy should protect the principle on which IP law is based, whether the works are generated by people or computer systems.

ITIF’s submission focuses on two key issues: the need for U.S. laws and regulations to recognize and protect AI-generated IP; and the need to assign ownership of AI-generated work to the person or organization that owns the AI. As AI-generated works are no different in kind than other works, there is no need for a special-purpose doctrine. But the creative potential of AI means that USPTO should consider policies that allow individuals and corporations to own IP for works without human authors.

Central to USPTO’s consideration of IP and AI should be a pragmatic and realistic understanding of AI and its capabilities. While AI systems can be increasingly autonomous and creative, they still have a considerable way to go before they achieve the sophistication that many people imagine. However, this should not preclude USPTO from making policy changes to account for AI’s current capabilities, knowing that it’ll only get better and that the earlier U.S. laws and regulations account for AI’s impact on IP and innovation, the better the United States will be in the long term.

QUESTION 1: AI-BASED WORK SHOULD RECEIVE IP PROTECTION

USPTO: Should a work produced by an AI algorithm or process, without the involvement of a natural person contributing expression to the resulting work, qualify as a work of authorship protectable under U.S. copyright law? Why or why not?

Work produced by AI should receive IP protections. The innovation incentive function of U.S. IP law should not change based on whether a computer or a person creates the output. While it is true that an AI system does not respond to the financial incentives that are central to IP-based innovation policy, the entities who develop and own AI systems most certainly do. USPTO should ensure U.S. laws and policies recognize (and not prohibit) non-human creativity and innovation, while clarifying the criteria, rules, and legal linkages for assigning rights to relevant owners (whether individuals, organizations, or firms).¹

As AI becomes ever more sophisticated, it is moving closer to joining the “creative class.” While this occurrence has been debated within IP circles for decades, we’re finally at a point where it is becoming a common practical issue, rather than a hypothetical scenario or ad hoc and novelty occurrence.² There are two ways of looking at AI, but both come to the same conclusion about how AI-created works should be treated by IP law.

One way is to consider AI as just another tool, analogous to dice, in providing non-deterministic outputs. In these situations it is still the human creator who determines how to use non-deterministic outputs to generate creative content.³

Another is to consider AI as something different than a tool, and more like an independent person. Imagine a parent trains a precocious child on research techniques, and then that child uses this training to discover something new on their own. Generally speaking, this child would get to claim full IP rights for their discovery.

Extending this analogy to AI systems, some may say an AI system is like the child trained by a grown up, and that anything it then creates should be the rightful IP of the AI system. While the human may have trained the AI system, as the parent trained the child, the AI system did all the work. And while an AI system could not exist without its human owner (to pay for hardware and electricity and keep it running), neither would a child survive without the parent (paying for food, clothing, and shelter). Indeed, AI systems are now capable of creating new works and new ideas on an increasingly autonomous basis. But IP law does not recognize non-human inventors or authors, so the risk then is that humans will have little incentive from IP law to create and train AI systems that can autonomously create new ideas. So in this situation, as in the first one, the human creator of the AI system should receive the IP rights for any discoveries and creative works.

The USPTO’s need to reconsider the criteria for assigning authorship of IP given that AI will likely be able to produce genuinely new and novel creations that in today’s largely analogue framework receives protection. U.S. policymakers need to reconsider the nature of creativity given that AI will likely be able to produce genuinely new and novel creations that in today’s largely analogue framework receives protection. U.S. IP law should not be biased against machines. For example, in 1998, John Koza developed an algorithm as part of

an “invention machine” that created simple circuit designs. In 2005, Mr. Koza’s machine passed one of the first “Turing tests” after a patent examiner (not knowing it was created by a computer) showed demonstrable creativity (a “non-obvious step” in IP law) and granted it a patent, making it one of the first intellectual property protections ever granted to a nonhuman designer.⁴ However, as ITIF argues should be the case, Mr. Koza was the one who actually obtained the patents generated from the machine’s output.

As long as the AI-based creation meets the conditions that statutory subject matter must meet before receiving IP protections it should receive protection. Policymakers should be consistent in recognizing AI-based creations that in today’s largely analogue framework would otherwise receive protection if it had a human creator/inventor. Although the AI system itself would be the proximate creator of the work, others, such as the owner/controller of the AI system at whose initiative the work is ultimately created, should be entitled to ownership of the AI’s works.⁵ USPTO should use this inquiry process to start the debate toward policy reforms to recognize AI-based creations and to ensure that the AI’s owning and controlling entities are the beneficiaries of its creativity.

Nothing in international treaty law explicitly authorizes, or prohibits, protections for such computer-generated works.⁶ The Berne Convention states the Union is created, “for the protection of the rights of authors in their literary and artistic works,” without defining who the author is, which it does due to the fact that, “national laws diverge widely, some recognizing only natural persons as authors, while others treat certain legal entities as copyright owners.” Furthermore, this debate is not new. In 1965, the Copyright Office’s annual report (in the section “Problems Arising From Computer Technology”) raises concerns about whether computers can author musical works.⁷ In the late 1980s and early 1990s, the World Intellectual Property Organization (WIPO) considered protections of “computer-produced works” in discussions of a possible (but never achieved) model copyright law.⁸ The debate around AI and IP is simply the latest iteration of this IP policy debate.

USPTO should build a framework to make two key differentiations: between users who merely push a button on a computer that uses AI and the genuine authors/creators of AI; and between the use of computers and AI as part of the process for creation (as a general tool) and when AI contributes substantially to the creation of IP itself. Virtually all type of copyrightable work is regularly created using computers, whether it’s Microsoft Word for literary works, architectural works using Autodesk’s AutoCAD, or pictorial and graphic works enabled by Adobe Photoshop. There is a clear dividing line between the creative techniques used by digital and analog authors. Cutting and pasting is easier and faster on a computer, but the verbs “cut” and “paste” betray their analog origin.⁹ The AI we’re referring to is the segment of technology that can be considered sophisticated and smart, not simply a process for automating a process as a matter of efficiency. But some AI systems go beyond relatively minor increases in efficiency and perform virtually all of the key tasks that leads to the creation of a new work.

The AI’s owner and operator should be the default owner of any IP it produces. USPTO will need to revise the way that IP law protects the link between the creator(s)—whether they’re a “composer”, “author”, or “inventor”—and their AI-based work, as the United States (and many other countries’) laws reference that the creator is a human. Parts of U.S. law present a barrier to AI-based creation as it does not consider the possibility of a non-human inventor.¹⁰ No statute governs the subject of such computer-generated works in

the United States. The U.S. Copyright Office has a policy prohibiting copyright for any non-human work—what it refers to as its “human authorship requirement.” The court case *Naruto v. Slater* (2018) came close to raising the issue, but the court avoided weighing in on the merits of non-human authorship.¹¹

If the USPTO wants to ensure that the United States remains a world leader in innovative digital technologies, it needs to start making changes to ensure it doesn’t discriminate against what is likely to be one of the most transformative general purpose technologies (similar to the microprocessor) of the future. Some advocates argue that computer-generated works should become public property.¹² While there is and should not be any restrictions on allowing an individual to use AI to create public domain content, requiring this would remove the incentive for people and organizations to invest the considerable time and effort into using an increasingly important driver of innovation. In the case of AI, the proximate creator may not be human, but the owning and controlling entity will be, whether it is an individual or organization. Despite AI’s increasing sophistication, AI does not operate autonomously, in a vacuum, outside of an individual or organization’s ownership and control—it is another source of creativity for people and firms to use to drive innovation.

Other countries provide realistic, pragmatic models and reference points for the USPTO, such as countries that provide copyright protection to computer-generated works, such as in Hong Kong, India, the United Kingdom, New Zealand, and Ireland.¹³ In 1988, the United Kingdom became the first country to include provisions on “computer-generated works” as part of its Copyright, Designs and Patents Act (“CDPA”). It states that these are works “generated by computer in circumstances such that there is no human author of the work.”¹⁴ Furthermore, as it relates to authorship, the CDPA provides that, “[i]n the case of a literary, dramatic, musical or artistic work which is computer generated, the author shall be taken to be the person by whom the arrangement necessary for the creation of the work are undertaken.”¹⁵ Of note, this protection only extends to literary, dramatic, musical and artistic works and not to media works (sound recordings, films, cable programs, and published editions), although a similar system also applies with regard to design rights.¹⁶ It’s therefore not a major leap to see how this could be adapted and extended to include AI-created copyright material and patented products. Rather than treating AI-based work as a work “generated by a computer in circumstances such that there is no human author of the work”, a computer-generated work should be a work “generated by a computer in circumstances such that the computer, if a natural person, would be an author.”¹⁷

Such a pragmatic approach stands in contrast to parts of the debate in Europe, which has tended to focus on much broader legal and ethical debates about how to account for and manage AI. For example, a 2017 report from the European Parliament’s Committee on Legal Affairs included a diverse, confusing range of legal, policy, and ethical issues and proposals around AI and robotics.¹⁸ In this same report, the Commission on Civil Law Rules on Robotics called for the European Commission to elaborate on “the criteria for ‘own intellectual creation’ for copyrightable works produced by computers or robots.” Meanwhile, the Committee on Industry, Research and Energy stated that next steps should “respect contractual freedom and leave room for innovative licensing regimes” and “cautions against the introduction of new intellectual property rights in the field of robotics and artificial intelligence that could hamper innovation and the exchange of expertise.”¹⁹

The report also called on the European Commission to create a specific legal status for robots, including bestowing “electronic personality” to robots when considering legal responsibilities in cases where they’ve caused injuries or damages.²⁰ In reaction, a group of 156 AI experts from 14 European countries sent a letter to the European Commission warning that granting robots legal personhood would be inappropriate from a legal and ethical perspective. (One could easily envision this leading to absurd results, such as a robot having to spend time in jail for injuring a human). The main focus of the opposition to the Europe Parliamentary proposal was that it would absolve robotics manufacturers of legal responsibilities for the actions of their machines (“I didn’t build a faulty robot, the robot itself was faulty.”)²¹

This debate in Europe focuses on one avenue for accounting for AI-based legal concerns, such as those related to IP creations: bestowing a degree of personage to the machine. A pop-culture analogy can be found in the “The Measure of a Man” (episode nine of the second season) of *Star Trek, the Next Generation*, which deals with question about Lieutenant Commander Data (a male android with a built-in AI system) and whether he is a piece of Starfleet equipment or a sentient being.²² In line with this, Malta is considering a robot citizenship test as part of its national AI strategy.²³ Similarly, other have suggested that computers should hold IP rights and that these could be shared under contract.²⁴ But of course, the big difference between “Mr. Data” and a Roomba robot is that the former had consciousness and free will. Roomba has neither and just bumps into things until it changes direction. And for the foreseeable future, AI will resemble Roomba, not Mr. Data.

QUESTION 2: AI-BASED COPYRIGHT WORK SHOULD RESIDE WITH ITS OWNING AND CONTROLLING ENTITY

USPTO: Assuming involvement by a natural person is or should be required, what kind of involvement would or should be sufficient so that the work qualifies for copyright protection? For example, should it be sufficient if a person (i) designed the AI algorithm or process that created the work; (ii) contributed to the design of the algorithm or process; (iii) chose data used by the algorithm for training or otherwise; (iv) caused the AI algorithm or process to be used to yield the work; or (v) engaged in some specific combination of the foregoing activities? Are there other contributions a person could make in a potentially copyrightable AI-generated work in order to be considered an “author”?

The human involvement that USPTO should focus on is on that of the owning and controlling entity using the AI for creative purposes. The involvement of a natural person should not be required for AI-based works to receive copyright protection, as long as it meets all the other criteria. But there needs to be a clear connection to an owner/operator, whether this is a person or corporation. For decades, machines have been autonomously generating works which have traditionally been eligible for copyright and patent protection.²⁵ In doing so, USPTO needs to differentiate between computer-generated works and the associated problem of who should be considered the rightsholder of these works. This issue of assigning authorship/ownership for AI-based work is akin to other, analogue copyright issues. The same challenges will arise in determining whether the work is an infringing copy, an unlawful derivative work, a lawful derivative work, a joint work, or a sole-authored work. Yet, this is more a legal question about how IP is generated and shared and used, rather than a question about whether the IP should be recognized at all.

To see this, imagine one scenario where someone buys an “AI machine” and sets it up so it generates songs and automatically posts those songs online with a royalty-free license as free for anyone to use. And it produces and uploads 100 songs a minute in perpetuity. The relevant IP question is not should the purchaser of the AI machine be able to copyright the songs or whether the songs are in the public domain. The relevant question is what the owner of the machine chooses to do (license the AI’s output, or let be in the public domain) and whether the AI machine is producing infringing work.

In line with this, USPTO should (conceptually) look at AI as some combination of an autonomous tool and employee/subcontractor—both work within the confines of a legal entity, who benefits from their labor, including their creativity. Outside of computer-generated works, U.S. copyright law already has a mechanism for authorship by artificial “persons.” In the case of a work made-for-hire, the employer for whom the work was prepared is considered the author for legal purposes.²⁶ Regardless of how autonomous AI may be, AI will be operating within the confines of a legal entity’s operations.

For example, in the case of drug discovery, researchers at Harvard University, the University of Toronto, and the University of Cambridge created a generative model, which they trained on 250,000 drug-like molecules, that generated plausible new molecular structures.²⁷ The AI can create drug compounds more independently of humans (although it does still suggest structures which are sometimes nonsensical) and without lengthy simulations.²⁸ These institutions controlled the AI and therefore should benefit from their work by being assigned any associated IP.

Questions about whether there should be some threshold or criteria for involvement for someone to be recognized as an author/creator related to AI is similar to debates that afflict analogue IP applications about who should or shouldn’t be recognized as an author/creator. Obviously, it would be useful for USPTO to use this submission process as the foundation for further research (as much as it can in the absence of relevant court cases and legal precedents) on where and how to draw the line between human involvement in AI that could allow an individual to qualify for authorship of an AI-based work, such as those on curating training data, observing processes, or setting AI’s orientation. However, this will be difficult in the absence of legal changes that first allow AI-based works to receive IP and corresponding court cases that help analyze these contextual factors that will likely go into a decision about where the line should be drawn.

The *Acohs vs. Ucorp* case in Australia highlights some of the potential issues USPTO will need to consider as part of its research, especially the potential difficulties in establishing authorship in the context of computer-aided or generated work.²⁹ Both firms in the case used software to help clients produce individualized reports (which each contain unique source code) about hazardous materials. Their systems are interoperable in that Ucorp used reports from Acohs. Acoh initiated a copyright-infringement case against Ucorp on the basis that its system was infringing the copyright of its reports. Acoh was not challenging Ucorp’s use of its reports, which is part of the implied license.³⁰ The court rejected Acoh’s claim that the source code was an original literary work as there was no evidence that the user, in entering the details of the hazardous material they needed information on, had in mind the resulting source code when they did this. However, the judge did recognize that the reports were original literary works, but Acoh’s case for protection failed on the basis that the judge could not identify joint authorship (of both the source code and the report output). The judge rightly rejected Acoh’s position on the ground that it was an artificial concept that the computer programmers

and the clients (who entered their data) collaborated with each other in the writing of the source code and in creating the reports. This highlights the challenge U.S. policymakers face in not only protecting the source code of AI, but the products they produce, and assigning authorship within the context of both scenarios.

QUESTION 3: AI SHOULD USE COPYRIGHTED MATERIAL LIKE EVERYONE ELSE

USPTO: To the extent an AI algorithm or process learns its function(s) by ingesting large volumes of copyrighted material, does the existing statutory language (e.g., the fair use doctrine) and related case law adequately address the legality of making such use? Should authors be recognized for this type of use of their works? If so, how?

In many cases AI simply automates processes and uses that were already (legally) taking place within the U.S. IP system. This highlights the fact that there is no need to rewrite the rules of copyright simply because AI systems are now one of the potential users of publicly shared content (as per the fair use doctrine). The three examples below provide specific issues and uses for USPTO to consider in the context of policies concerning copyright, data, and AI.

Text and Data Mining and Copyright/Fair Use

Copyright law can stifle the use of text and data mining (TDM)—two automated techniques for analyzing data—on resources they can legally access and analyze with non-automated means. The use of data mining on copyrighted material often falls foul of existing intellectual property laws because the technical process involves accessing and extracting data from its original source and copying it into another database for analysis.

For example, even if individuals or firms can lawfully access and read the material, such as through a university library subscription, copying a substantial part of works may infringe copyright in those works (what is ‘substantial’ depends on the context and circumstances). U.S. copyright law should allow publishers to set the subscription fees for access to their content, prohibit unauthorized reproductions of their content, and receive appropriate compensation. But it should not require people with lawful access to content, such as paid subscribers, to seek approval from publishers for using automated research methods.

TDM has become a copyright issue in the United States and around the world.³¹ In the United States, TDM is governed by “fair use,” especially as it relates to “non-consumptive uses.” The U.S. copyright regime is considered more favorable to TDM practices than what appears to be the case under European laws, in part, because of the inherent flexibility of the fair use doctrine.³² Defining the exact scope of fair use under U.S. copyright law has been a matter of judicial application and case law development.

However, combining copyrighted works (assuming the user has legal rights to use the material) into a searchable database that yields useful information is a permissible fair use. There is case law that suggests that acts of incidental or intermediate copying which do not ultimately result in the external re-use of protectable (expressive) parts of a copyright work should not be considered infringing.³³ After all, there is nothing illegal about “mining” databases manually; AI-based technology only automates the process. For example, the “Google Book’s” project provides a searchable index of quotes and snippets of text from 25-plus million books it scanned (under fair use).³⁴ (The main legal issue was whether the quotes and snippets go beyond fair

use.) The USPTO should ensure that U.S. IP frameworks allow people/firms to do this, while respecting the rightsholder and ensuring that proper licensing arrangements and payments are made and followed.

Text and data mining are powerful tools that allows researchers in a wide range of disciplines, from bioinformatics to digital humanities, to plough through texts and datasets and interpret minute details. In the field of computational linguistics (e.g. human language technology, or natural language processing), some experts estimate that TDM already accounts for about 25 to 30 percent of all research projects.³⁵ For scholars and scientists, access to the rigorously scrutinized work of their peers, such as academic journals and databases, has always been a vital resource. Researchers who subscribe to these sources can explore them using traditional keyword searches and meta-tags predefined by publishers, but that has serious limitations. However, manually reviewing all of these sources is a slow and tedious process, the results of which are often inaccurate and incomplete. TDM gives researchers the ability to not only find a needle in a haystack, but to quickly find and categorize all manner of small objects hidden in many hundreds or thousands of haystacks.

For example, medical researchers can use technologies like natural language processing to quickly analyze the outcomes of thousands of clinical trials. Similarly, TDM technologies can be used to process the data contained in a large collection of scientific papers in a particular medical field to suggest a possible association between a gene and a disease. In line with this, Elsevier—a global information analytics business—allows subscribers to carry out independent text mining research and offers customized text mining services in the fields of life sciences and pharmaceutical research.³⁶ Indicative of its management of IP, Elsevier can add (upon request, no doubt after payment, licensing, and rightsholder recognition issues are agreed) other licensed content to the database that its clients want to use for TDM.³⁷ This type of analysis supports efforts to develop data-driven precision medicine initiatives that use the latest evidence to deliver personalized treatments. Data mining cannot provide all of the insights gained from human experts closely studying texts, but it does allow researchers to use rapidly developing tools to draw on a much larger pool of literature and data to support their work.

USPTO should monitor policy developments overseas and the impact of frameworks that provide an explicit exception that allows researchers to make copies of works ‘for text and data analysis’ for non-commercial uses. In 2014, the United Kingdom enacted legal changes that provide this type of exception.³⁸ Similarly, the European Union is considering a specific exception for research institutions to carry out text and data mining on lawfully accessed, copyright-protected works.³⁹ This exemption is reasonable because it creates a special dispensation for data mining and does not alter other laws that prohibit the unauthorized extraction or reproduction of copyrighted works. ITIF considers this a good first step, but the EU should also allow everyone to take advantage of these more efficient and effective data-driven research methods.⁴⁰ In that it would be better to have a rule that applies to everyone in how they use data mining on copyrighted material—so long as they have authorized access and do not make illegal reproductions.

Facial Recognition and Creative Commons Licenses

The recent backlash to the idea of using publicly available photos to train facial recognition systems highlights some misunderstanding in how U.S. copyright law permits the use of copyrighted works for computational purposes, such as training an AI or machine learning systems.⁴¹ In March 2019, IBM created the “Diversity in

Faces” dataset to provide a set of photos of peoples’ faces of various ages and ethnicities to help reduce bias in facial recognition systems.⁴² IBM compiled the dataset from photos people shared online with a license which allows others to use the images for any purpose (under a creative commons license).⁴³ The widespread use of these licenses has been a tremendous boon to society and the economy by creating a wealth of valuable content that others can freely use and adapt for their own purposes, and the “Diversity in Faces” dataset is a perfect example of how openly licensed works generate valuable benefits.

It is clear that IBM can lawfully distribute images with Creative Commons licenses. While some people may be opposed to facial recognition technology, and not like that their images were used to train some company’s algorithms, that does not mean copyright law is broken or needs to be changed, or that IBM did anything wrong. As Ryan Merkley, the chief executive officer of Creative Commons, notes, “copyright is not a good tool to protect individual privacy, to address research ethics in AI development, or to regulate the use of surveillance tools employed online.”⁴⁴ It would be unfortunate if general public angst about AI led to the popularization of licensing agreements that explicitly prevent the computational use of data. Platforms like Flickr should resist any pressure and continue to offer technology neutral licenses, ensuring that any data a human can access, a computer can also access. And companies like IBM should be encouraged to continue to package datasets for public use.

Unfortunately, misunderstandings about how open licenses work are commonplace and responsible for new waves of outrage. More recently, an October *New York Times* article called attention to another facial recognition training dataset compiled from openly licensed Flickr photos called MegaFace.⁴⁵ People included in the database expressed similar distaste and frustration, failing to acknowledge that their (or, for people whose childhood photos were included, their parents’) use of open licenses explicitly allows for this kind of use. Ultimately, there are limits to the amount of control individuals have over content they share publicly—whether they do this online, in print, or in person. There is no need to rewrite the rules of copyright simply because AI systems are now one of the potential users of this publicly shared content.

AI Musicians, Fair Use, and Copyright

The case of Avia Technologies and its AI performer—called Avia, which stands for “Artificial Intelligence Virtual Artist”—highlights how AI can be applied creatively and legally.

AVIA composes classical music, which is used in soundtracks for film directors, advertising agencies, and game studios. All of AVIA’s music is copyright protected. AVIA was the first AI to be official recognized as a composer, having been registered under France and Luxemburg’ authors’ right society (where all of its copyright resides under its own name).⁴⁶ However, while AVIA’s music is largely indistinguishable from the work of human musicians, its compositions still require human input with regards to orchestration and musical production, which no doubt features in its copyright applications. But this points towards a broader potential model for revised intellectual property protections for AI creations, given it recognizes the role of owners/creators in managing their AI, much like current law would a human composer that worked as an employee or contractor.

AVIA uses machine learning to understand and model high-level abstractions in data, such as the patterns in a melody. On top of this, AVIA uses reinforcement learning, which teaches the software to decide what action to take next (which means it does not need labelled inputs or outputs of data). In this way, AVIA improves its performance without needing explicit instructions. Avia Technologies taught AVIA by feeding it large databases of classical music, which allows it to capture concepts of music theory in order to develop its own model of music theory, allowing it to compose its own music.

The founders of Avia Technologies focused on classical music for two reasons: it's the predominate style used in the background of movies, games, etc.; and all the training data—the classical music by Mozart, Beethoven, etc.—are in the public domain (as their copyright protection has expired).⁴⁷ This highlights a critical point—that just because digital content may be available, does not mean that the legal framework should disregard existing IP protections if it used as an input to AI creations.

In the case of copyright-protected material, U.S. law should look at AI created music, and related concerns about infringement, in much the same way it already does in cases where another human artist who creates a song that sounds like (or samples directly from) an existing one. Much as human artists are influenced by other musicians, AI-based systems should also be able to listen to music in creating its own, original compositions. Obviously, if it creates undistinguishable copies or samples of the music without permission, that would be an infringement, just as George Harrison's composition of "My Sweet Lord" was ruled an infringement on the rights of Bright Tunes, a New York publisher, for the song for "He's So Fine" written by Ronnie Mack and part of its catalog. Similarly, if AI-based musicians are marketed as sounding like a particular musician (after being trained on their music), that raises the prospect of infringing publicity and likeness rights. Inevitably, there will be scenarios where assessing infringement by AI will be difficult, but this is not unique to AI. Just as the current debate about infringement between human artists and whether one uses notes, lyrics, or a melody of a song from another, U.S. courts would have to analyze the gray zone to determine when a case involves AI, music, and potential infringement.⁴⁸

QUESTION 5: COMMERCIAL NEGOTIATIONS SHOULD DEFINE OWNERSHIP RIGHTS

USPTO: Should an entity or entities other than a natural person, or company to which a natural person assigns a copyrighted work, be able to own the copyright on the AI work? For example: Should a company who trains the artificial intelligence process that creates the work be able to be an owner?

Commercial negotiations should define the relationship between the developer of an AI service that is subsequently sold or used (such as under license) to a person or organization. The person or organization that owns and operates the AI may buy the AI service outright, thereby ensuring that they own any IP it generates. Alternatively, the developer of the AI may stipulate in the sale or use contract that they should be recognized as a co-creator of any subsequent IP it generates.

QUESTIONS 9 AND 10: USING IP TO PROTECT DATABASES AND DATA SETS USED BY AI

USPTO Question 9: AI systems need good training data to be effective and suffer performance issues if this data is incomplete, inaccurate, or not representative. Much of the debate over patent policy is about where to draw the lines between protection and incentives for innovation versus less protection and greater sharing for learning. A similar tension applies to how to think about ownership and usage rights for training data for AI.

USPTO Question 10: How, if at all, does AI impact trade secret law? Is the Defend Trade Secrets Act (DTSA), 18 U.S.C. 1836 et seq., adequate to address the use of AI in the marketplace?

Firms should be able to use either copyright or trade secret protections, depending on which legal tool best fits their situation. In the United States, databases can be protected by copyright as long as there is some creativity and work involved in their construction. There's also the Defend Trade Secrets Act that lets firms protect databases, as long as they take reasonable measures to limit exposure and ensure secrecy (such as implementing password protections, restricting access to certain facilities, and use confidentiality clauses in contracts.⁴⁹

Policymakers need to keep IP protections for AI-data training sets in mind as the value of data does not usually come from it being sold (the data brokerage business notwithstanding), but from it being used internally within a firm. As Duch-Brown, Martens, and Mueller-Langer wrote, “Unlike in copyright-protected media products that are meant to be distributed widely, data are not necessarily widely shared and may not need legal protection to make them excludable.”⁵⁰ Furthermore, the aggregation of data into what people term “big data” is often where the most value is created. For example, while having data about the location and speed of a particular car may be interesting, it is not all that valuable except to the person who is driving (and perhaps their family). But accumulating data from tens of thousands of cars in a metropolitan area and displaying it on a map (e.g., Waze) is incredibly valuable as it gives travelers and first responders real-time information about traffic conditions.

Trade secret protections are a good way to protect training data given the considerable time and money firms put into generating their own or curating other sources of data. It shouldn't be unreasonable for firms to expect that, with computed information, that rights and protections should accrue to the party and the data involved at the heart of the work. For example, when a company spends time and effort to create an advertising profile for an individual, that company should have the rights to that data, presuming they complied with all relevant privacy laws and regulations. Finally, with associated information, the organizations that produced the information should have primary rights.

In the context of trade secrets and databases, it is not a violation for a company to possess the same data as another company if it collected or created the information on its own and did not take it from the other company. Some have argued that trade secrets are a bit of a kluge because some data is not necessarily kept secret—even though organizations do not want others to use it.⁵¹ The point is not that the data is secret, but rather that the “owner” of the data wants to limit its use. Moreover, this does not preclude the use of contracts to protect the rights of a firm regarding its data if it shares that data with others, just as it would not

preclude this in the case of a rightsholder setting out a license to allow the use of copyright-protected material.⁵²

Copyright and trade secret laws for AI training data are key tools for firms, but need to be used alongside other legal remedies and administrative and technical actions. Firms need supplementary protection via computer hacking laws given data is at risk from internal theft and cyber-attacks. Similarly, firms need to use technical means, such as encryption, to protect data. When an organization effectively encrypts its data, both at rest and while in transit, its ability to keep its “ownership” and the value that comes with it increases significantly. However, some foreign governments have considered erecting regulatory limits to organizations’ ability to use these technical protection measures.⁵³

While any IP system for data should probably tilt toward encouraging data sharing given aggregated data is more valuable than the sum of individual data, this does not mean a data-related IP system should default to no IP rights or even forced sharing. The costs involved with the collection, cleaning, and curation of data are often non-trivial, and when organizations that engage in such efforts lack exclusive rights to use that data, their incentives for collection, cleaning, and curation are diminished. Likewise, the non-rivalrous nature of data does not mean that if one firm is able to protect its training data, it prevents others from collecting and using the same data to support the creation of several new products, services, or methods of production. This means that any company can engage with the same data in different data-sharing arrangements with other big companies, SMEs and startups, or even the public sector. This way, the value resulting from the data can be exploited to the maximum.⁵⁴

However, policymakers need to distinguish between forced sharing of proprietary information only the company has and forced sharing of more public information (e.g., customers’ smart meter data). Just as forced licensing of drugs reduces the revenue and incentives for innovators, forced data sharing would do the same. It costs money to collect, clean, organize, and maintain data. Forced sharing assumes data and its collection, storage, and management are free. To be sure, in some cases, regulators have required companies to make data available to competitors (typically in the context of mergers).⁵⁵ This is also separate to the specific scenario whereby in some industries and markets (such as real estate and airlines), a small number of firms have exclusive access to particular datasets, and they exploit their market power to limit access to that data through both technical and administrative means without any legitimate business justification.⁵⁶

QUESTION 12: OTHER ISSUES: AI AND DEEPAKES

USPTO: Are there any other AI-related issues pertinent to intellectual property rights (other than those related to patent rights) that the USPTO should examine?

Case: “Deep Fakes” and the Legitimate Uses of AI-Based Technology for Creative Purposes

The increasingly realistic AI-based technology that allows content creators to tell the stories of real-life people and events in TV shows and movies—such as through docu-dramas—can also be used maliciously to insert a person’s likeness into objectionable content, especially fake pornographic content featuring famous actresses and falsified speeches by politicians. So-called “deep fakes” are essentially the use of artificial intelligence to swap a person’s face onto another’s body. The AI uses a neural network of publicly available images to depict

an individual as performing without their consent. Policymakers around the world are only just beginning to consider the impact of digital replicas and voice and image manipulation software on entertainers and expressive works. While there are some cases of deep fakes being used to spread disinformation, according to Facebook, Google, and others who track the progress of deep fakes, they're mostly used to spread humor or fake pornography.⁵⁷

The underlying technology has many legitimate creative uses. Movie/TV producers have used similar, but less advanced, technology for some time.⁵⁸ More recently, major digital effects studios have used AI to convincingly map a famous actor's likeness onto another performer's to add value to their stories, as well cut down production time and costs. For example, 2018's *Guardians of the Galaxy 2* showcased a de-aged, 1980s version of star Kurt Russell, while 2016's *Rogue One* re-created Peter Cushing's Grand Moff Tarkin character from 1977's *Star Wars: A New Hope*, despite the fact that Cushing died in 1994.⁵⁹

While "deep fakes" are a troubling and rapidly growing problem, like many other technology issues, policymakers shouldn't ban the underlying technology given its many legitimate uses, but target cases where it is used for specific malicious purposes.⁶⁰ For example, without explicit exceptions for expressive works, some U.S. state's proposed bills (such as New York) targeting the use of deep fakes for malicious purposes would preclude movie/TV show creators from telling the stories of real-life people and events.⁶¹ The First Amendment of the U.S. Constitution protects creators working on fiction, non-fiction, or some hybrid of the two. This is why any new policy related to deep fakes should explicitly exempt first amendment-protected uses, including news reporting, commentary, and analysis.

It can be more straightforward for a person to be protected from deep fakes through privacy laws when it involves non-consensual sex-scenes, deep-fakes porn, and non-consensual nude performances.⁶² Obviously, the challenge then becomes identifying the individuals involved in creating the deep fakes. Many U.S. states and countries also have "revenge porn" laws that criminalize the publication of an intimate image without consent (although it's a matter of seeing whether courts apply this law to the case of deep fake pornography videos).⁶³ There's the potential for these deep fake videos to constitute criminal harassment (depending on whether a state/country's laws include provisions about misusing a person's image/likeness).⁶⁴ Beyond using existing and new legal tools to address the malicious use of this technology, companies like Google and Facebook are actively developing tools to help identify deep fakes.⁶⁵

This AI-based technology is also relevant to IP issues when it is used to infringe publicity and likeness/personality rights. The right of publicity prevents the unauthorized commercial use of an individual's name, likeness, or other recognizable aspects of one's persona. It gives an individual the exclusive right to license the use of their identity for commercial promotion. In the United States, the right of publicity is largely protected by state law (where it varies from state to state). Only around half of the states recognize it.⁶⁶ However, federal unfair competition law provides a related statutory right to protection against false endorsement, association, or affiliation. Internationally, the rights analogous to the right of publicity are sometimes recognized as "personality rights," "rights of persona," or other similar terminology.

However, intellectual property law already provides a framework for the legitimate use of this AI-based technology. Musicians, actors/actresses, or their respective estates can give permission for others to use their

likeness/publicity/personality rights as part of some new creation.⁶⁷ For example, hologram-based concerts featuring dead musicians may become more popular as the technology gets better. There have already been sold-out shows (with \$200 tickets) for a holographic performance by Roy Orbison, but again, this is done with the consent of the performer's estate.⁶⁸ This leads to a key question for policymakers as to the intellectual property connection to cases where a "deep fake" is derived from copyright-protected material, as it would be infringing these rights given it's an unauthorized modification and republication.

Similarly, performers may not want their likeness to enter the public domain upon death. In the United States, the right of publicity and rights to digital replicas have long been a priority for the SAG-AFTRA union and its members.⁶⁹ If there is value to a person's likeness after their death, their family or whoever makes up their estate (whether this is friends or a designated charity) should receive the fruits of their labors. Some people would also no doubt want to be excluded from commercial use of their likeness all together (such that a person's reputation may be harmed if it is subsequently associated with a particular cause/company/or issue).

QUESTION 13: OTHER RELEVANT AI-IP OBJECTIVES – INTERNATIONAL COLLABORATION

USPTO: Are there any relevant policies or practices from intellectual property agencies or legal systems in other countries that may help inform USPTO's policies and practices regarding intellectual property rights (other than those related to patent rights)?

USPTO should actively engage with counterparts (such as the United Kingdom) and the World Intellectual Property Office and other international forums about AI's interaction with IP and innovation and the different ways to support this. There is a need for countries to enact broadly similar (or at least not conflicting) rules and criteria around many IP issues raised by AI and its use of data. The territorial nature of IP affects issues around AI as it does every other IP issue. For example, at the moment, inventors in the United Kingdom, India, and elsewhere may get their computer-generated work recognized at home, but may not receive reciprocal protection in other countries. In fact, people and firms that invest time and money in developing sophisticated AI in these countries may jeopardize their IP rights in other jurisdictions by basing their application on an AI author or inventor.⁷⁰

ENDNOTES

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