FORMULATING A NOVEL FRAMEWORK FOR ARTIFICIAL INTELLIGENCE PATENT INNOVATION IN THE CONTEXT OF A PANDEMIC ERA

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ABSTRACT

This paper explores the intersection of artificial intelligence and patent innovation, highlighting the unique challenges and opportunities of the pandemic era. The study aims to propose a comprehensive framework that addresses these challenges while fostering innovation in AI-related patents, ultimately contributing to economic recovery and technological advancement. The framework will incorporate strategies for collaboration among stakeholders, leveraging open innovation and agile methodologies to accelerate the development and protection of AI technologies. Additionally, the research will analyze case studies of successful AI patent innovations during the pandemic, identifying best practices and lessons learned that can inform future strategies. Furthermore, the implications of regulatory changes and their impact on patentability in the AI sector will be examined, ensuring that the framework remains adaptable to evolving legal landscapes. This holistic approach aims to create a sustainable ecosystem that not only protects intellectual property but also encourages continuous growth and adaptation in the rapidly changing field of artificial intelligence. This will involve engaging with policymakers, industry leaders, and academic institutions to foster a collaborative environment that prioritizes innovation while addressing ethical considerations and societal impacts. By leveraging diverse perspectives and expertise, we can develop comprehensive guidelines that balance the need for protection with the imperative of fostering creativity and technological advancement. This collaborative effort will also seek to identify best practices for the responsible use of AI technologies, ensuring that advancements benefit society while mitigating potential risks associated with misuse or unintended consequences. Furthermore, ongoing education and public awareness campaigns will be crucial in demystifying AI, empowering individuals to understand its capabilities and limitations, and encouraging informed discussions about its future. By fostering an inclusive dialogue among stakeholders, we can create a framework that not only promotes innovation but also safeguards

fundamental rights and values, paving the way for a future where technology serves humanity effectively and ethically.

Keywords: artificial intelligence, patent innovation, pandemic, AI technology

I) INTRODUCTION

The COVID-19 pandemic has emerged as a global crisis, resulting in millions of infections and hundreds of thousands of fatalities within a brief span. The absence of vaccines, FDA-approved treatments, and reliable diagnostic tests has exacerbated this international health emergency. To effectively counteract the swift propagation of the virus, it is imperative to develop a rapid response mechanism that can aid in managing the ramifications of the pandemic. At the forefront of the battle against COVID-19, artificial intelligence (AI) technology has proven to be a formidable asset in the creation of innovative drugs, vaccines, and diagnostic techniques. AI platforms have been designed to monitor and predict outbreaks, process health-related claims, coordinate drones and robotic systems for supply delivery, identify individuals at high risk, and offer consultative information.

In an impressive feat, the South Korean biotech firm Seegene harnessed an AI system to formulate a novel testing methodology for the coronavirus—accomplished in an unprecedentedly brief timeframe, as such protocols typically require several months of collaboration among a large team of scientists. Additionally, the Chinese technology leader Alibaba has developed an AI-driven platform capable of detecting complications from the coronavirus in chest CT scans with an accuracy rate of 96%. While a seasoned physician typically requires approximately 15 minutes to interpret a single CT scan, Alibaba's AI system can generate a diagnostic result in merely 20 seconds, utilizing data from over 300 CT images. Furthermore, the Canadian startup Bluedot's AI system successfully anticipated the virus outbreak even before the World Health Organization (WHO) officially announcing the identification of a novel coronavirus.[1] Continuously, Bluedot's AI gathers and analyzes COVID-19-related information, including news articles, medical databases, public health reports, expert commentary, as well as transportation and climate trends, to ensure timely forecasts and risk assessments regarding the rapidly spreading disease.

[1] *Niiler E, 'An AI Epidemiologist Sent the First Alerts of the Coronavirus' (Wired, 25 January 2020) https://www.wired.com/story/ai-epidemiologist-wuhan-public-health-warnings/*

These instances underscore several essential attributes of AI tools—they are remarkably efficient, precise, innovative, adaptive, and swift. Such characteristics position AI tools as our most effective resources in the ongoing fight against COVID-19.[2] Recognizing the potential of AI, the White House has urged researchers to leverage AI technologies to sift through tens of thousands of research papers to elucidate the origins of the coronavirus. U.S. Chief Technology Officer Michael Kratsios articulated the agency's aspiration that AI will expedite the research process beyond human capabilities while also revealing insights that may elude human analysts. Indeed, AI technology possesses the ability to automatically identify patterns from vast datasets. As the AI system categorizes the similarities and differences in digital datasets, it persistently enhances its output through continuous learning and development, thereby facilitating the generation of novel predictions and inventions.

However, the quest for a vaccine is inherently linked to patent applications. Can pharmaceuticals generated by AI be subjected to patent rights? This query prompts a broader discussion: are inventions produced by AI eligible for patent protection? Are existing patent laws applicable in this context? This discourse serves as the principal focus of the article. We assert that, in order to motivate stakeholders and promote investment in inventive AI systems (including AI algorithms and AI-trained models), inventions produced by AI should be patentable. Nonetheless, under current legislation, only human inventors qualify for patent ownership, indicating a necessity for a revised framework.

Numerous anti-coronavirus solutions developed through AI technology, encompassing pharmaceuticals, vaccines, diagnostic tools, medical devices, and robotics, should be subject to patent rights to stimulate investments and incentivize creators throughout the developmental process.[3] Presently, scholars are engaged in debates concerning whether the patent duration should be extended beyond 20 years to enhance incentives for innovation or whether patent rights should be temporarily suspended to facilitate public access to otherwise patented cures. Nonetheless, these discussions entirely overlook the applicability of patent law to inventions involving AI. This inquiry constitutes the central focus of this article.

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[2] *Frohwitter T-C, 'How Artificial Intelligence Is Supporting Humanity in the Battle against Coronavirus' (The Observer) https://fordhamobserver.com/45135/opinions/how-artificial-intelligence-is-supporting-humanity-in-the-battle-against-coronavirus/*

[3] *Jin R, 'Potential Coronavirus Drug: Patent Rights amid Global Pandemic' (Fordham Intellectual Property, Media & Entertainment Law Journal, 29 March 2020) http://www.fordhamiplj.org/2020/04/03/potential-coronavirus-drug-patent-rights-amid-global-pandemic/*

In the realm of AI inventions, there are predominantly two categories of innovative AI applications. The first category encompasses the creative AI systems themselves, often termed "creativity machines," which possess the capability of autonomously generating new inventions. These systems can be likened to creative powerhouses that ideate innovations without human intervention. The second category consists of AI-generated inventions, which refers to the resulting innovations produced by AI systems. To illustrate these two varieties of AI innovations, we reference the example of Dabus, an AI system that independently conceived two inventions—a uniquely designed beverage container and a lighting apparatus that flickers in a rhythm resembling neural activity. The Dabus system represents the creative AI entity, while the two inventions it produced are classified as AI-generated inventions. Dabus was the inaugural AI system to be recognized as an inventor in filed patent applications. However, months after the submission of these patent applications, both the European Patent Office (EPO) and the United Kingdom Intellectual Property Office (UKIPO) denied the Dabus patent applications on the basis that only human beings can be acknowledged as inventors.

There are typically three distinct perspectives regarding the patent protection of AI inventions. The first perspective arises from advocates of patent rights who support innovative AI systems and contend that these systems can supplant human inventors, thereby warranting recognition as legitimate patent inventors. In the current era characterized by advanced, automated, and autonomous technologies, an AI system is proficient in generating inventions without human intervention. The autonomous inventive capabilities of AI lead to the logical assertion that such systems should be afforded rights and responsibilities akin to those of a traditional inventor. Ryan Abbott, a law professor in the U.K. and a member of the Dabus development team, argues that inventions produced by AI should be eligible for patent protection, and that the AI system itself ought to be acknowledged as the inventor, possessing the corresponding rights of inventorship.[4] Similarly, Donald Chisum, a prominent scholar in patent law, advocates for the patentability of digital technologies by asserting that innovative computer algorithms should be subject to patent protection. The second perspective regarding patent protection for AI inventions is held by detractors, who emphasize the inadequacies of the existing patent framework in the context of AI. One of the authors of this paper, Professor Shlomit Yanisky-Ravid, posits that “traditional patent law has become outdated, inapplicable, and irrelevant concerning inventions generated by AI systems.” She proposes an alternative approach that

[4] *‘Log In’ (- HeinOnline.org) https://heinonline.org/HOL/Welcome*

moves away from patent protections, advocating for an open-source model to abolish patent rights for all AI inventions, thereby promoting greater disclosure and advancement of technology. The third perspective is aligned with maintaining the current legal framework, wherein scholars suggest that patent law should remain largely unchanged to circumvent the complexities of the legislative process. Minor adjustments could be considered, such as the issuance of new agency regulations like patent office examination guidelines. Additional suggestions include modifying the patentability criteria to necessitate that AI inventions demonstrate replicable results. Furthermore, some propose a multi-tiered framework that applies varying patentability standards based on the level of autonomy exhibited by the AI system.

II) The Innovative Capability of Artificial Intelligence

A) Not a Work of Fiction: An Inventor Utilizing Artificial Intelligence Is Already Present

DABUS, the AI system that became the first to be named as an inventor on a patent, might be a trailblazer in legal terms, but it's far from the first example of AI creating inventions on its own.[5] Over the years, there have been several instances where AI systems have successfully generated novel ideas without direct human involvement. A notable early example is John Koza's "invention machine," which is an AI system built on genetic programming, formulated to simulate biological evolution and tackle complex problems. Koza not only patented the machine itself but also obtained patents for the unique inventions it produced, particularly in the realm of industrial control systems.

During the COVID-19 pandemic, AI has shown its potential in real-time problem-solving, contributing to the rapid development of new diagnostic tools and treatments. One such example is Seegene's coronavirus diagnostic tests, which were developed in just a few days with the help of an AI system capable of autonomously designing biological assays. This AI-driven process demonstrates remarkable creativity, outpacing human researchers in both speed and efficiency. A representative from Seegene explained that the assays created by the AI system performed just as well as, or even better than, those developed manually. It is great that

[5] *Yanisky-Ravid S and Liu X (Jackie), 'When Artificial Intelligence Systems Produce Inventions: The 3A Era and an Alternative Model for Patent Law' [2017] SSRN Electronic Journal*

AI took only four days to design two new assays, a task that would take over a year to accomplish.[6]

AI's impact on creativity extends to the pharmaceutical business, where it has revolutionized drug discovery. AI systems are currently employed at all stages of the process, from finding disease targets and screening molecules to developing novel medications and forecasting their efficacy and toxicity. For instance, IBM's Watson has helped identify novel drug targets related to RNA-binding proteins, which could aid in treating neurodegenerative diseases.[7] In the UK, AstraZeneca's AI-driven drug design team has created new drug structures that might have been overlooked by human scientists.[8]Another artificial intelligence system, Atom Net, has been used to predict the efficacy and safety of new medication candidates, allowing researchers to concentrate their efforts on the most promising possibilities. These instances demonstrate that AI is not only expediting drug discovery but also providing fresh ways that human minds may not have imagined.

Despite these advancements, some critics still argue that human involvement is necessary for AI-generated inventions. While people are critical in the development of AI systems, giving the necessary data and supervising their training, it is important to recognize that once an AI system is activated, its innovative outputs may function independently of human intervention. The creation of fresh thoughts, whether by AI or humans, should be viewed through the lens of innovation rather than as insignificant jobs. As AI's capacity for creativity and problem-solving grows, we must examine how we can properly identify these systems' innovative contributions.

B) How Does an Artificial Intelligence System Invent?

We endeavor to comprehend the mechanisms through which an artificial intelligence (AI) system can generate novel concepts by referring to the various definitions of AI. The conceptualizations of AI systems differ based on objectives, domains, subject areas, and other

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[6] *'Seegene Develops World's First Multiplex MDX Assays with Its AI System' (Seegene Inc) https://www.seegene.com/press_release/seegene_develops_worlds_first_multiplex_mdx_assays_with_its_ai_system*

[7] *Bakkar N;Kovalik T;Lorenzini I;Spangler S;Lacoste A;Sponaugle K;Ferrante P;Argentinis E;Sattler R;Bowser R;, 'Artificial Intelligence in Neurodegenerative Disease Research: Use of IBM Watson to Identify Additional RNA-Binding Proteins Altered in Amyotrophic Lateral Sclerosis' (Acta neuropathologica) https://pubmed.ncbi.nlm.nih.gov/29134320/*

[8] *'How We Do It' (Atomwise) https://www.atomwise.com/how-we-do-it/*

attributes pertinent to the specific AI system in question. According to Merriam-Webster, artificial intelligence (AI) is "a branch of computer science which focuses on simulation of intelligent behavior in computers" or "the ability of a machine to replicate intelligent human behavior." [9]

The creativity of an AI system is intrinsically linked to its capacity to emulate human intelligence, despite not being constructed or operating in a manner akin to the neurons and synapses of the human brain. Drawing upon the understanding of the mathematical-statistical frameworks that underlie prevalent AI systems, one contributor to this discourse, Professor Shlomit Ravid-Yanisky, delineates AI through at least eight fundamental characteristics that differentiate AI systems from conventional software.

Owing to the intrinsic characteristics embedded within every AI program, these systems are capable of executing novel tasks creatively, autonomously, and unpredictably, thereby striving to furnish innovative solutions. To illustrate, an AI system operating on a genetic algorithm may implement random mutations to produce unpredictable outcomes in pursuit of the optimal solution. It may filter through a large number of expected outcomes to improve the answer by removing less desirable possibilities. By iterating this process, the system eventually produces the most effective solution. Machine learning, a subclass of AI, is especially effective at absorbing massive quantities of data (such as photos, videos, and sensory information) and distinguishing patterns; it may also innovate by producing new data that corresponds with current patterns. The CEO of Semantic, an AI graphics enterprise, elucidates how his AI system formulates new artworks: “if you provide it with thousands of paintings and images, there emerges a mathematical framework whereby you can adjust the parameters or vectors and produce entirely new creative outputs akin to the training material.”[10] Nonetheless, the AI developer may be unaware of the particular mechanics via which an AI system creates innovative ideas. Artificial intelligence systems, particularly deep neural networks, are notoriously opaque. This problem, known as the "black box" conundrum, originates from the systems' tendency to provide little assistance on the reasoning behind their decisions.

In this discussion, we look at the implications of creative AI systems within the current patent

[9] ‘*Artificial Intelligence Definition & Meaning’ (Merriam-Webster) https://www.merriam-webster.com/dictionary/artificial%20intelligence?Utm_campaign=sd&utm_medium=serp&utm_source=jsonld*
[10] *‘IBM Watson’ (IBM, 9 July 2024) https://www.ibm.com/watson*

legal framework. These AI systems can create innovations that, if imagined by humans, may be eligible for patent protection. We want to answer various questions, including whether a creative and inventive AI system may be awarded patent protection. Are the novel inventions, whether in product or process form, generated by the AI system patentable? Should the evaluation of AI-generated inventions, encompassing both creative AI systems and AI-generated innovations, be differentiated from the assessment of human-generated inventions? The subsequent sections elaborate on the complexities surrounding the patenting of creative AI systems and AI-generated inventions.

III) Artificial Intelligence's Implied Patentability

An invention must meet a number of criteria in order to become a patent under U.S. law, including reciting subject matter that is eligible for patents and possessing the attributes of innovation, non-obviousness, and utility. These standards are meant to guarantee that only worthy inventions that advance the general well-being of society are given the exclusive 20-year rights to create, use, sell, and import the invention. The following examines each patent requirement and shows how each aspect of the existing patent regime is challenged by AI technology.[11] According to this paper, AI inventions—both creative AI systems and AI-made inventions—do not fit inside the conventional framework of patent law. As a result, we propose a new patent model that is especially designed to safeguard the nuances of AI technology.

A) Matter eligible for patent protection

According to 35 United States Code 101, eligible patent subject matter is described as a "new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof". The Supreme Court warned that ideas such as laws of nature, and of physical phenomena, and abstract ideas are not eligible for patents. In the groundbreaking case of Alice Corporation Pty. In the case Alice corporation pty. Ltd. v. CLS Bank International, the Supreme Court used a two-step test to decide on the patentability of an invention, examining if the claims are directed to patent-ineligible concepts and analyzing if additional elements transform the claim into a patent-eligible application in search of an inventive

[11] *'Patent Basics' (United States Patent and Trademark Office - An Agency of the Department of Commerce, 26 October 2023) https://www.uspto.gov/patents/basics*

concept.[12] We argue that the subject-matter eligibility requirement poses challenges and uncertainties for patenting AI inventions.

Firstly, an innovative artificial intelligence system and an invention created by AI could be labeled as performing mental steps that are not eligible for a patent. AI is created by replicating human intelligence through processing data, inputting information, and outputting results, so an AI system might naturally possess characteristics of the human mind. Following Alice, the Federal Circuit and district courts have ruled against several computer-related process and system claims, deeming them to be abstract mental steps. The principle of mental steps has previously invalidated patent claims related to artificial intelligence. In a patent related to AI and digital watermark technology, the court ruled that the patent claims are not valid as they mimic the human skill of identifying and acknowledging a signal. Megvii, a Chinese tech company, created an AI platform for reporting fevers by combining facial detection with body temperature sensing in reaction to the coronavirus pandemic.[13] The AI's capability in recognizing faces could include steps similar to how humans identify specific facial features like the distance between the eyes or the shape of the chin. The platform's reporting cases of fever had connection to abstract concepts of image recognition in the human mind could make it unpatentable; Difficulty in securing patents could deter AI researchers from creating similar AI tools.

Second, an AI system is expected to be considered a data-manipulating mathematical process that cannot be patented. The Supreme Court's definition of "algorithm" is a method for solving a specific mathematical problem, and they decided that a mathematical algorithm lacking significant practical use is considered abstract and cannot be patented. An AI system has a core algorithm that is likely ineligible for patent protection. Donald Chisum claims that the Supreme Court's narrow view of "algorithm" as solely mathematical is limited as algorithms can also be created to address non-mathematical issues.[14] Additionally, the non-numerical aspect of the algorithms generated by AI is highlighted by their use of various tasks like machine learning, decision making, text analysis, language processing, and speech recognition. Therefore, it is

[12] *'Alice Corp. v. CLS Bank Int'l, 573 U.S. 208 (2014)' (Justia Law) https://supreme.justia.com/cases/federal/us/573/208/*
[13] *'AI Firms Deploy Fever Detection Systems in Beijing to Fight Outbreak' (South China Morning Post, 14 February 2020) https://www.scmp.com/tech/policy/article/3049215/ai-firms-deploy-fever-detection-systems-beijing-help-fight-coronavirus*
[14] *Robertson B, 'Covid-19 + AI Virtual Conference' (Innovators magazine, 27 March 2020) https://www.innovatorsmag.com/covid-19-ai-virtual-conference/*

unconvincing to deny a patent that to for AI based as just for the sole reason that it involves a mathematical idea.

During the pandemic era, AI prediction systems are engaging in imaginative behaviors instead of just relying on mathematical principles. Bluedot's machine learning AI platform predicted the COVID-19 outbreak before the WHO officially announced it. Chan Zuckerberg's Biohub is creating an AI tool to estimate unreported coronavirus infections, and Stanford university researchers are adapting an AI system to predict which patients need more medical intervention. While humans play a role in AI systems, these systems independently forecast disease spread and severity by learning from various sources like public health authorities, databases, social media, news, and climate patterns. Despite the innovative algorithms, AI systems can be seen as abstract mathematical algorithms that cannot be patented, with a high probability of discouraging researchers from developing new systems or algorithms for practical solutions.

Thirdly, a creative artificial intelligence system might not qualify for a patent due to the exclusion of "generic computer implementations" from patent eligibility. According to the machine-or-transformation test, the subject qualifies if it is connected to a specific machine or alters a particular article into a new form. It appears that an imaginative AI system could meet the machine-or-transformation test criteria if viewed as a machine. Yet, the Supreme Court has clarified that the machine-or-transformation test is not the only factor in deciding if a process can be patented, meaning that even if a system is just a computer program on a machine, it could be rejected if considered a "generic computer implementation" under Alice.[15] If there is an AI creativity system that can create new inventions across many areas, it might not be eligible for patents because it is seen as a basic computer program. On the other hand, if the AI creativity system can only produce solutions in a specific area, it may not be seen as universal enough to qualify for a patent. Ironically, banning patent rights for generic creativity machines could lead to unintended consequences: researchers may be less motivated to create highly advanced AI creativity machines with diverse uses, and instead focus on a more specialized AI tool for a single industry.

The fourth challenge in patenting AI inventions relates to new AI medical diagnostic tools, as

[15] *'Bitlaw' (ENFISH, LLC v. Microsoft Corp., 822 F. 3d 1327 (BitLaw)) https://www.bitlaw.com/source/cases/patent/Enfish.html*

courts might view linking a disease to a physiological level as merely a natural law. In Mayo Collaborative Servs. v. Prometheus Labs., Inc., the Supreme Court ruled that patent claims regarding the connection between blood concentration of specific metabolites and drug effectiveness or harm were deemed invalid because this connection is a natural law. The Federal Circuit, in accordance with the Mayo ruling, has invalidated numerous medical diagnostic patents by arguing that the diagnostics are natural phenomena. During the pandemic, it is crucial to stress the importance of having effective diagnostic tools for coronavirus. Several research teams have utilized AI technology for COVID-19 diagnosis. Vocalis Health, an Israeli company, gathered voice samples from COVID-19 patients and used an AI algorithm to analyze them in order to detect a distinctive vocal pattern for diagnosing the disease. A Canadian group, supported by Amazon, developed an AI platform to diagnose COVID-19 by quickly analyzing CT images of the patient's chest instead of using the current PCR tests that are time-consuming.[16] Their AI technology is capable of connecting the chest CT scan with the level of seriousness of the COVID-19 infection. The Court's ruling that medical diagnostic tools are connected to natural laws means that new AI diagnostic tools might not be able to be patented, potentially reducing researchers' motivation to develop them.

Based on the aforementioned four points, AI systems designed for creativity and the innovations created by AI systems, particularly in the realm of medical diagnostic tools, could be considered as not eligible for patent. However, obtaining a patent for the invention is highly crucial, and if patent rights are taken away, it may hinder professionals from finding solutions to the issue. During the pandemic, biomedical companies may hesitate to invest in new cures due to uncertainty about financial rewards without reliable patent rights, resulting in a lack of motivation. We propose that AI creations such as creative AI systems and AI-generated inventions should be able to be patented in order to address the issue. Later as said, we will explore the idea and theoretical justifications for how patenting such subject matters can encourage innovation and acknowledge hard work. Next, we will investigate the obviousness factor involved in AI inventions.

B) Obviousness

As per 35 USC 103, the claimed invention must not be obvious to a person with ordinary skill

[16] *'Israeli Defense Ministry Launches COVID-19 Voice-Test Study' (Technion UK, 26 March 2020) https://technionuk.org/news-post/israeli-defense-ministry-launches-covid-19-voice-test-study/*

with regard to the relevant art based on the differences from prior art before the effective filing date. Here we contend that the obviousness test does not apply to AI inventions.

Initially, the standard of a "person having ordinary skill in the art" (POSITA) has presented challenges when assessing the patentability of AI inventions. The clarity is assessed through the eyes of a POSITA, defined as a "hypothetical individual assumed to know about all relevant prior art." Nevertheless, in the AI field, the identity of the POSITA is not clearly defined. Is the POSITA the programmer, the AI system, or another human contributor? One way to evaluate the obviousness requirement is to answer the question negatively or consider who cannot be considered a POSITA.[17] The Supreme Court describes the POSITA as someone with average creativity, not a robot. The Federal Circuit states that the person of ordinary skill in the art is also assumed to think conventionally and not to engage in innovation. According to these two views, it appears that a creative AI system cannot be considered a person having ordinary skills in the art. Moreover, the programmer may be familiar with the AI program, but they may lack specialized knowledge in the particular field where the AI is being used (such as medicine or business) and may not necessarily have all the necessary prior knowledge as mandated by the Federal Circuit. Some suggest that if AI is commonly used in the relevant field, a person of ordinary skill in the art could possibly utilize an AI system. We refer to this as an elevated POSITA standard - if an AI system is used by a person of ordinary skill in the art to determine obviousness, the level of creativity required may be increased because of the advanced capabilities of the AI tool. Is it justifiable to apply a more rigorous standard when assessing an AI-generated invention, while only using the traditional standard for evaluating inventions created by humans? If we continue evaluating human-made and AI-made inventions using the same criteria, it appears unfair to have separate standards based on the identity of the inventor. We suggest creating an AI patent track model to differentiate between AI inventions and those created by humans. The unique systems would enable the modification of established standards by POSITA without significantly impacting fairness.

Secondly, using the motivation test to determine the non-obviousness of an AI patent seems ineffective if the person skilled in the art does not utilize AI technology. According to the motivation test by the Federal Circuit, we determine if there is motivation in the prior art to

[17] '*KSR International Co. v. Teleflex Inc. et al., 550 U.S. 398 (2007)' (KSR International Co. v. Teleflex Inc. et al., 550 U.S. 398 (2007) | United Nations) https://unctad.org/ippcaselaw/ksr-international-co-v-teleflex-inc-et-al-550-us-398-2007*

make modifications for creating the new invention. AI tools are commonly used to tackle difficult challenges, which may discourage individuals from improving upon existing technology to reach the AI-generated solution. Therefore, the motivation test could be fulfilled because of the complexity of the issue rather than the level of originality.

Furthermore, the test known as the "obvious-to-try" test, which considers predictability and the likelihood of success in the eyes of a person skilled in the art, is also not relevant. The Supreme Court in KSR introduced a criterion called obvious-to-try, stating that a combination of prior art would be considered obvious if there are a limited number of known solutions with anticipated success. AI, with its random mutation algorithm, possesses an unpredictable element. The unpredictability may lead to unexpected results from AI that are not obvious for trial, resulting in unimpressive patents that hinder innovation and blockage of the patent system.

When dealing with a brand new issue, such as the recently identified COVID-19, the expert's viewpoint would be restricted, and there would be little previous knowledge available. A skilled craftsman needs time to become acquainted with the details of the recently arisen crisis and to understand the meanings from the previous work.[18] When the average person's understanding may be slower to catch up with an urgent situation, the conventional POSITA benchmark is inadequate for assessing quickly generated solutions to a new problem. It is possible to debate that a POSITA can promptly grasp the details about the new emergency and the significance of previous knowledge because a POSITA is a hypothetically competent individual "who is assumed to be knowledgeable about all relevant prior art" as stated by the Federal Circuit.

Furthermore, we believe that the timing of patent evaluation exposes AI innovations to hindsight bias. The USPTO takes around 21 months on average to complete the first substantive examination of a patent application. Despite an invention being nonobvious initially, it may seem obvious in the eyes of the patent office or courts after some time. Meanwhile, AI is currently a highly preffered after technology, leading to a rapid increase in AI startups. The slow process of patent examination contrasts sharply with the rapid expansion of the AI industry. The quick advancements in AI technology may result in fewer hindsight rejections

[18] *(Standard Oil Co. v. American Cyanamid Co., 774 f.2d 448 | casetext search + citator) https://casetext.com/case/standard-oil-co-v-american-cyanamid-co-2*

during long examination processes. In order to address this issue, we propose utilizing expedited patent review and a reduced patent term for AI creations given the rapid obsolescence of the technology. The details for the new patent track model will be outlined at a later time. After that, we will explore the topics of written description and enablement.

IV) A Different Approach—AI-Specific Patent Pathway Model

COVID-19 has significantly transformed our daily lives, as well as brought new issues for patent law in the field of artificial intelligence technology. Patenting AI innovations to address COVID-19 may provide challenges in practically all patent criteria, including patent-eligible subject matter, obviousness, written description, enablement, usefulness, novelty, and inventorship.[19] When we urgently need an anti-virus remedy in response to a quickly changing health problem, patentability concerns may prevent researchers from developing novel diagnostics and therapies.

Unlike those who suggest minor adjustments to the present patent law framework, and those who contend that patent law is entirely inapplicable, we offer a new patent track model that uses a separate set of criteria and gives different rights expressly for AI inventions. We suggest that the new AI patent track model include the following features:

A) *Safeguarding Creative AI Systems and Inventions Generated by AI*

As elaborated in the preceding section regarding patent-eligible subject matter, innovative AI systems and inventions generated by AI may confront patentability challenges due to their purported reliance on mental processes, mathematical operations, generic computer applications, or natural laws within the medical diagnostics domain. We posit that such inventions ought to be patentable to foster innovation and acknowledge the effort invested. In particular, we provide a theoretical rationale for the patent eligibility of creative AI systems (encompassing both algorithms and trained models) and AI-generated inventions through the lens of law-and-economics theory and labor theory.

From the perspective of law and economics, a contractual agreement exists between the public and inventors, wherein inventors receive exclusive rights over their inventions for a defined

[19] *Yanisky-Ravid S and Jin R, 'Summoning a New Artificial Intelligence Patent Model: In the Age of Pandemic' (SSRN, 30 June 2020) https://pmc.ncbi.nlm.nih.gov/articles/PMC7366817/*

duration to stimulate innovation, while the public gains access to these inventions post-expiration of said period. A creative AI system capable of autonomously generating innovations comprises at least two essential components: the foundational AI algorithms and the trained model derived from the AI system's learning and training results. We advocate for the AI patent track model to acknowledge both elements of AI creative systems as patentable subject matter in light of the law-and-economics rationale.

Firstly, we argue that allowing patents for AI algorithms, a core element of AI-driven creative systems, will encourage research into the fundamental components of AI. This would not only speed up the development of AI technology itself but, also, drive progress in various fields such as medicine, engineering, and science. As previously illustrated, the AI platform integrating facial recognition with fever detection to identify potential coronavirus patients, as well as the AI system that anticipates virus outbreaks, exemplifies the type of AI algorithms that necessitate patent protection in response to public health emergencies. During an April congressional hearing on the oversight of the USPTO, director Andrei Iancu remarked that "human-created algorithms conceived through human ingenuity are distinct from discoveries and the mathematical representations of those discoveries".[20] This statement expressed the agency's belief that creative algorithms are distinct from those unprotectable mathematical representations, which gave rise to some optimism over the patentability of AI algorithms. We look forward to future legislation that will address the issues facing the patent system in the context of artificial intelligence.

Secondly, we argue that allowing for the patenting of AI-trained models, another component of creative AI systems, would incentivize trainers and data scientists to develop new innovative AI models aimed at addressing practical issues. AI-trained models exhibit remarkable proficiency in deriving solutions by learning from training data and target characteristics. For instance, DeepMind represents a trained model that acquires problem-solving skills and propels advancements across various fields, including science, medicine, and energyA medical artificial intelligence model created by the Center for Clinical Artificial Intelligence in Cleveland is capable of predicting a patient's mortality risk within 48 to 72 hours post-hospital

[20] *Steve Brachmann Steve Brachmann is a graduate of the University at Buffalo School of Law, 'USPTO Director Andrei Iancu Discusses Patentability of Algorithms, Ptab Proceedings at Senate Judiciary Committee - Ipwatchdog.Com: Patents & Intellectual Property Law' (IPWatchdog.com | Patents & Intellectual Property Law, 19 April 2018) https://ipwatchdog.com/2018/04/19/uspto-director-andrei-iancu-patentability-algorithms-ptab-senate-judiciary/id=96059/*

admission, thereby enabling healthcare practitioners to devise prioritized treatment plans for the most critical cases. During the pandemic, AI-enhanced models have significantly proliferated as diagnostic instruments. An Israeli firm utilized AI systems to analyze the vocal characteristics of individuals infected with coronavirus and has developed an AI model proficient in recognizing new patients based on their vocalizations. Similarly, a Canadian team is attempting to diagnose COVID-19 through CT chest imaging, employing an AI model that learns from a vast array of CT lung images of coronavirus patients. Permitting the patenting of AI-trained models would alleviate the challenges associated with patenting medical diagnostic tools that might be claimed to express a natural law.

B) *Change of POSITA standard*

The standard of a Person Having Ordinary Skill in the Art (POSITA) may not be suitably applied in the evaluation of obviousness regarding artificial intelligence inventions, specifically in relation to both the motivation test and the "obvious to try" framework. The Federal Circuit considers numerous factors to assess the skill level attributed to a POSITA; however, as asserted by Ryan Abbott, the court may have overlooked a significant variable—namely, the technologies employed by practitioners in the field, which are of considerable relevance to the competencies of these practitioners. If the utilization of artificial intelligence is regarded as a fundamental skill within the AI sector, the POSITA, who is "presumed to be aware of all the relevant prior art" in accordance with the Federal Circuit's criteria, should also possess the capability to utilize a conventional AI tool that is considered routine and inherently non-creative. We advocate for the characterization of the POSITA standard within the AI patent examination framework as "a skilled individual employing a conventional AI tool in the domain."[21] We define the conventional AI tool as an AI system that has previously been disclosed in the prior art and explicitly does not encompass the AI creativity machine capable of independent invention

C) *Examination of patent by use of AI*

We endeavor to comprehend the mechanisms through which an artificial intelligence (AI) system can generate novel concepts by referring to the various definitions of AI. The

[21] (Standard Oil Co. v. American Cyanamid Co., 774 f.2d 448 | casetext search + citator) https://casetext.com/case/standard-oil-co-v-american-cyanamid-co-2

conceptualizations of AI systems differ based on objectives, domains, subject areas, and other attributes pertinent to the specific AI system in question. The Merriam-Webster dictionary provides a broad technological interpretation, defining AI as "a branch of computer science focused on the simulation of intelligent behavior in computers" or "the ability of a machine to replicate intelligent human behavior." The creativity of an AI system is intrinsically linked to its capacity to emulate human intelligence, despite not being constructed or operating in a manner akin to the neurons and synapses of the human brain. Drawing upon the understanding of the mathematical-statistical frameworks that underlie prevalent AI systems, one contributor to this discourse, Professor Shlomit Ravid-Yanisky, delineates AI through at least eight fundamental characteristics that differentiate AI systems from conventional software.

D) *Patent Lifetime*

"In the AI industry, the invention process as well as product life cycles can sometimes be extremely short." The lifespan of AI patents may not necessitate the standard duration of 20 years that is characteristic of utility patents. We advocate for a reduction in the patent lifespan for AI inventions, which would facilitate a more expedited transition of the technology into the public domain, thereby enhancing the dissemination of knowledge. We do not support an absolute suspension of patent rights, as this would effectively "throw a wet blanket" over the enthusiasm for developing novel AI solutions.[22] It can be contended that a reduction in patent duration would disincentivize efforts directed towards AI research and development. While pharmaceutical companies may aspire to maintain their drugs under patent protection for extended periods, a therapeutic agent for coronavirus, for instance, may not require the full 20-year exclusivity of patent rights, considering the potential for viral evolution, the likelihood of formula enhancements, and the introduction of competing drugs into the marketplace.

V) Potential challenges and rebuttals to the AI-specific patent track model

The following delineates several prospective obstacles associated with the novel AI patent track framework, accompanied by counterarguments. Initially, it may be contended that AI patents could inhibit subsequent innovators from utilizing the patented technology. For example, given that the AI algorithm serves as the foundation for AI systems, a patent on an

[22] *'Budapest Treaty' (Wikipedia, 17 September 2024) https://en.wikipedia.org/wiki/Budapest_Treaty*

AI algorithm may restrict future implementations based on that algorithm. However, we contend that patent rights do not constitute a monopoly in the antitrust context. In truth, patents reflect a compromise between the need to encourage innovation and the avoidance of monopolistic behaviour. The imperative for incentives to stimulate technological advancements may take precedence under certain conditions, such as during the ongoing health crisis where fatalities occur daily due to the unavailability of approved effective drugs or vaccines.

Securing patents for AI inventions does not obstruct patent holders from licensing their cutting-edge technology.[23] Licensees can use the provided authority to create further works, such as employing the AI creative system to generate a fresh innovation. The license agreements can be adapted to the public interest, depending on the urgency and importance of the requested application. lawmakers from throughout the world have recently campaigned for compulsory patent licensing for coronavirus vaccines and treatments, expressing their fears that patent rights might stymie low-cost access to effective remedies.Several European nations, India, and Canada have previously used compulsory licensing, which allows governments to authorise themselves or other parties to use a patent without the patent holder's approval. In contrast, in the United States, there is no general right to impose forced licensing.

The "march-in rights" established under the Bayh-Dole Act of 1980 may compel licensing of a federally-funded patent at most, rather than a pharmaceutical patent developed by a major corporation. In the U.S., the most viable approach to utilize a pharmaceutical company's patent remains through the patent holder's agreement. Given the priority of ensuring access to life-saving medications during a pandemic, pharmaceutical companies may be amenable to temporarily relinquishing their patent rights. despite the fact that China's Wuhan Institute of Virology submitted a new patent application for Gilead's potential coronavirus remedy. Gilead has stressed that "it is too early to discuss any compulsory or other types of licensing at this stage" and that their current focus is on assessing the drug's efficacy in clinical trials before subsequently increasing production following confirmed clinical outcomes.

This debate emphasises numerous issues related with the evolving paradigm for patenting machine-created ideas, as well as some counterarguments. One prevalent fear is that patents

[23] *'Chisum on Patents' (LexisNexis Store) https://store.lexisnexis.com/products/chisum-on-patents-skuusSku10111*

for these breakthroughs may prevent future innovators from improving upon current technologies. For instance, awarding a patent for an algorithm used in machine systems could restrict other developers from using that method to create new applications. However, it's important to keep in mind that patent rights don't provide an unconditional monopoly, as outlined by antitrust law. The necessity for incentives to propel technological progress may supersede other considerations under specific circumstances, such as during the current health emergency where daily fatalities occur due to the lack of approved effective pharmaceuticals or vaccines.

Acquiring patents for AI innovations does not prevent patent holders from licensing their advanced technologies. Licensees can use the rights granted through a patent to create new innovations, such as applying the technology to develop a fresh invention. Licensing agreements can be structured to serve the public good, with terms adjusted based on the urgency and importance of the intended use. For instance, lawmakers globally have recently pushed for mandatory licensing of patents related to COVID-19 vaccines and treatments, citing worries that patent rights could restrict access to affordable options during a worldwide health emergency. Several European countries, along with India and Canada, have previously enacted compulsory licensing, allowing governments to permit themselves or third parties to utilize a patent that is without the consent of the patent holder. Conversely, in the United States, there is no universal entitlement to enforce mandatory licensing.

The "march-in rights" established by the Bayh-Dole Act of 1980 may necessitate licensing of a federally-funded patent at most, rather than a pharmaceutical patent developed by a major corporation. In the U.S., the most feasible method for utilizing a pharmaceutical company’s patent remains contingent upon the agreement of the patent holder. Given the critical importance of ensuring access to life-saving medications during a pandemic, pharmaceutical firms may be inclined to temporarily forgo their patent rights. This is underscored by the fact that China’s Wuhan Institute of Virology has filed a new patent application concerning Gilead’s potential coronavirus treatment. Gilead has emphasized that “it is premature to consider any compulsory or alternative licensing at this juncture” and that their current priority is to evaluate the drug's efficacy in clinical trials before subsequently ramping up production following validated clinical results.

The apprehension regarding employment may arise from the concern that the incentives

provided to the artificial intelligence sector through patent rights could pose a threat to the human labor force. A report released by the McKinsey Global Institute indicates that as many as 800 million jobs globally could face jeopardy due to automation within the next dozen years. It is important to acknowledge that automation, driven by industrial advancement, is unavoidable even in the absence of AI.[24] The rapid acceleration in computer performance, as evidenced by Moore's law, has historically expedited the pace of industrialization even prior to the advent of AI, and this trend will persist in displacing human workers engaged solely in monotonous, repetitive tasks. Certainly, the employment opportunities generated by AI warrant consideration. The labor force may evolve in response to the burgeoning AI industry, as the McKinsey report observes that "when certain tasks are automated, employment within those fields may not necessarily diminish; instead, workers might undertake new responsibilities" by transitioning to different roles or enhancing their skill sets to align with labor market demands. The demand from employers for AI-oriented positions has more than doubled between 2015 and 2018. Projections indicate that between 2018 and 2022, AI is anticipated to generate 58 million new jobs worldwide.

In the context of the coronavirus pandemic, there exists a trepidation that granting a 20-year patent monopoly on a coronavirus treatment could exacerbate price gouging and stifle innovative progress by subsequent developers of similar medications. We suggest that removing a pharmaceutical entity's patent rights would remove critical incentives, making it extremely difficult to recover the significant expenses paid during a decade of medication research and development. Furthermore, in the lack of patent protections, scientists and researchers may see their work as insufficiently paid. We observe a "patent maximalist" perspective advocating for an extension of patent durations for coronavirus therapies beyond the established standard of 20 years; however, we contest this prolonged patent term. Under our proposed model for AI-specific patents, we advocate for a reduced patent lifespan to reconcile the need for incentives with the apprehensions surrounding exclusive rights. Within the context of the coronavirus situation, Senator Ben Sasse adopts a conciliatory stance in favor of patent incentives. In his recent legislative proposal, the Facilitating Innovation to Fight Coronavirus Act, the Senator proposes a temporary suspension of patent rights during the pandemic while offering, as a compromise for this delay, a 10-year extension of the patent

[24] *Manyika J and others, 'Jobs Lost, Jobs Gained: What the Future of Work Will Mean for Jobs, Skills, and Wages' (McKinsey & Company, 28 November 2017) https://www.mckinsey.com/featured-insights/future-of-work/jobs-lost-jobs-gained-what-the-future-of-work-will-mean-for-jobs-skills-and-wages*

term. This legislative measure could effectively address the pressing need for a cure while simultaneously providing an extended duration of patent protection to stimulate future innovation endeavors.

VI) CONCLUSION

COVID-19 has impacted every aspect of life and every sector of society. The realm of patent rights is not exempt from the effects of the coronavirus. The pandemic presents a unique opportunity to reevaluate the existing patent framework, particularly concerning the application of AI technologies in combating the virus. Numerous patent law difficulties occur as a result of AI breakthroughs, showing that existing patent rules may not sufficiently address AI-generated innovations and creative AI systems. As a result, we urge the creation of an innovative framework to solve these difficulties by establishing a unique patent pathway particularly suited for the evaluation and inspection of AI-related discoveries.

It is essential to create a dedicated AI patent pathway because the existing patent law framework has created significant obstacles and ambiguities in the patenting of AI innovations regarding nearly all patentability criteria. In this article, we meticulously examine each relevant issue—including subject matter, eligibility, utility, novelty, non-obviousness, written description, enablement, and inventorship—to illustrate that most, if not all, facets of patent law are ill-suited to the AI landscape; only a transformative new patent pathway tailored for AI inventions can adequately address these challenges while preserving the incentive for innovation.

Our proposed AI patent pathway offers a unique scope of protection for creative AI systems (encompassing cutting-edge AI algorithms and AI-trained models) and AI-generated inventions—all of which may currently lack patentability under the existing legal regime. To elucidate the specifications of AI inventions that may be intrinsically complex, this pathway innovatively mandates the submission of AI working models to the patent office. Furthermore, the new pathway redefines several ambiguous or irrelevant aspects of patent law to align more closely with the digital tools of the 3A era, particularly regarding the standard of the "person skilled in the art," the timing and methods of examination, and the duration of patent protection.

This article aims to tackle various patent-related challenges in the context of the pandemic. Nonetheless, several questions remain unanswered: Who should own the patent coming from

AI inventions? Who is responsible for patent enforcement? Does the infringement doctrine require a rethinking in the context of AI? One sure remains: we intend to use AI's powers to benefit humans. In challenging times like those posed by COVID-19, the enhancement of humanity can be realized through the implementation of the proposed new patent pathway. As stated by Virginia Rometty, current chair, president, and CEO of IBM, "some people call this artificial intelligence, but the reality is this technology will enhance us. So instead of artificial intelligence, we think we'll augment our intelligence."