

A Preliminary Study on the Ownership of Artificial Intelligence Inventions in View of Indonesian Intellectual Property Law

Happy Yulia Anggraeni^{1*}, Ayat Muhayat², Dewi Sri Agustin³, Egi Firmansyah⁴, Farid Akmal Nugraha⁵

¹ Faculty of Law Islamic University of Nusantara
EM happy.anggraeni@uninus.ac.

² Faculty of Law Islamic University of Nusantara
EM ayatmuhayat@uninus.ac
dewisriagustin@uninus.ac

³ Faculty of Law Islamic University of Nusantara
EM dewisriagustin@uninus.ac

⁴ Faculty of Law Islamic University of Nusantara
EM egifirmansyah@uninus.ac.

⁵ Faculty of Law Islamic University of Nusantara
EM faridakmal@uninus.ac

*Corresponding author: Happy Yulia Anggraeni (happy.anggraeni@uninus.ac)

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Abstract

In the future, it is predicted that Artificial Intelligence will become an important part of everyday life. In connection with that, artificial intelligence technology can create a work of art or can even create an invention that is protected by law, especially copyright or patent, which can affect the future protection of Intellectual Property Rights on a work created by artificial intelligence. The purpose of this research is to analyze relevant legal issues related to the granting of protection of Intellectual Property Rights over inventions and works derived from artificial intelligence. This research is a descriptive analytical normative legal research. This research finds that the responsibilities and rights of patent holders are regulated in Article 19 of Law Number 13 Year 2016 on Patents which explains that product patents cover the manufacture, use, sale, importation, leasing, delivery, or provision of patent-protected products for sale, lease, or delivery. Moreover, it is not clear from a legal, technical, and policy standpoint what is meant by inventions made or assisted by Artificial Intelligence. However, such inventions and the use of Artificial Intelligence as a tool or method in the development of data concepts, used in machine learning modeling to make data-driven predictions based on input and output data, are essential components of algorithm development. Thus, stakeholders in the existing Intellectual Property Rights infrastructure should take necessary actions to amend, adapt, and accommodate well-guided policy formulations to incorporate Artificial Intelligence inventions with social, ethical, and human safety in mind.

Keywords

patent; artificial intelligence; ownership; invention.

In the future, it is predicted that Artificial Intelligence (AI) will become an important part of everyday life.² However, the increasing complexity and autonomous decision-making capabilities of AI-powered systems, along with their possible use in various industries, pose significant legal and regulatory challenges. The adopted AI strategy does not thoroughly address the current intellectual property rights legal framework appropriate for AI.

A society that can overcome various social issues and problems by utilizing various innovations born in the era of the 4th industrial revolution, such as the use of the internet for all community activities (Internet of Things), is referred to as Society 5.0 during the 4th industrial revolution. Along with technological developments, especially the 4th industrial revolution, it has an impact on people's behavior.³ The emphasis of this research is on artificial intelligence technology, one of the innovations of the fourth industrial revolution. A computer program initially creates an algorithm that is executed with a programming language as the input instruction and the algorithm in the computer program determines the output of the instruction. However, nowadays, computer program technology has used more complex algorithms than before because the algorithms are written in a programming language. Computer programs with complex algorithms are referred to as artificial intelligence because they have capabilities similar to human intelligence that can think, plan, learn, and determine to perform

certain actions.⁴ Because of the more complex algorithms, computer programs process the instructions given and can determine their own output instructions just like humans who process a certain problem and can solve the problem with various considerations.⁵

In that regard, artificial intelligence is a term that refers to the use of human intelligence by machines programmed to mimic human actions and ways of thinking.⁶ A generated invention is defined as an invention made autonomously by an artificial intelligence system under conditions where no individual is naturally qualified as an inventor. As traditionally defined as an inventor, an invented invention is an invention autonomously made by an artificial intelligence system under conditions where no natural person qualifies as an inventor.⁷ Thus, the creation and protection of Intellectual Property "refers to creations of the mind: inventions; literary and artistic works; and symbols, names, and images used in commerce." This is the basis of the intellectual property system, which includes rights and obligations, as well as privileges and incentives.⁸

Because artificial intelligence technology can produce a work of art or even innovation that is legally protected, especially by copyright or patent, so that it can affect the protection of Intellectual Property Rights (intellectual property) in the future for a work produced by artificial intelligence.⁹ Artificial intelligence technology is a concern for

² Zhao Yan Lee, Mohammad Ershadul Karim, dan Kevin Ngui, "Deep learning artificial intelligence and the law of causation: application, challenges and solutions," *Information & Communications Technology Law* 30, no. 3 (2 September 2021): 255–82, <https://doi.org/10.1080/13600834.2021.1890678>.

³ Alison Lui dan George William Lamb, "Artificial intelligence and augmented intelligence collaboration: regaining trust and confidence in the financial sector," *Information & Communications Technology Law* 27, no. 3 (2 September 2018): 267–83, <https://doi.org/10.1080/13600834.2018.1488659>.

⁴ Josephine Bhavani Rajendra dan Ambikai S. Thuraisingam, "The deployment of artificial intelligence in alternative dispute resolution: the AI augmented arbitrator," *Information & Communications Technology Law* 31, no. 2 (4 Mei 2022): 176–93, <https://doi.org/10.1080/13600834.2021.1998955>.

⁵ Jon Truby dan Rafael Brown, "Human digital thought clones: the Holy Grail of artificial intelligence for big data," *Information & Communications Technology Law* 30, no. 2 (4 Mei 2021): 140–68, <https://doi.org/10.1080/13600834.2020.1850174>.

⁶ Nachshon (Sean) Goltz dan Giulia Dondoli, "A note on science, legal research and artificial intelligence," *Information & Communications Technology Law* 28, no. 3 (2 September 2019): 239–51, <https://doi.org/10.1080/13600834.2019.1644065>.

⁷ Rachmadi Usman, *Hukum Hak atas Kekayaan Intelektual (Perlindungan dan Dimensi Hukumnya di Indonesia)* (Bandung: Alumni, 2003).

⁸ Khoiril Hidayah, *Hukum Hak Kekayaan Intelektual* (Malang: Setara Press, 2017).

⁹ Samuel Meira Brasil, "Rules and Principles in Legal Reasoning. A Study of Vagueness and Collisions in Artificial Intelligence and Law," *Information & Communications Technology Law* 10, no. 1 (1 Maret 2001): 67–77, <https://doi.org/10.1080/13600830124910>.

Intellectual Property Rights in this situation. Technology-related inventions are protected through the use of patents. Man-made technology is constantly evolving, so any invention in the field of technology made in accordance with the times, particularly technological advancements, must be protected by patents.¹⁰ Since artificial intelligence is a by-product of technical growth, especially during the current 4th industrial revolution, it should be included in the objects protected by patents in these situations.¹¹ However, Indonesia's Patent Law No. 13/2016 governing Patents does not contain any provisions on the creation of artificial intelligence. The absence of concrete regulations governing artificial intelligence inventions under Indonesian patent law makes it difficult for innovators in the field of artificial intelligence technology to determine whether their ideas are eligible for patent protection.

However, interest in AI has increased in some recent policy developments. One of the main concerns people have towards AI is the possibility of job loss in the future. Consider that most contemporary economic systems require workers to produce goods or services and be paid an hourly wage for their work.¹² Machine learning takes time to become useful, as AI is not immune to errors. AI can perform well if trained well using good data, and the opposite will happen with errors or bad data. For the Indonesian government, the widespread use of artificial intelligence technology today and in the future presents both challenges and opportunities, especially with regard to laws governing intellectual property rights, particularly patent law, which includes patent provisions for AI technology.¹³

Correspondingly, this structural component of intellectual property is very important as it

describes the technical and statistical features of machine learning and deep learning in HaKI systems, which over time become more autonomous. intellectual property inventions are a collection of inventions that use AI as a tool to do one thing and develop intellectual property as an output to do another with human assistance at various levels. Since algorithms bind computers with instructions, cognitive autonomy is not related to algorithms. An invention, in the sense of a creation of the mind, is a new and useful tool, method, process, or product that is incorporated and designed. Therefore, this study analyzes the relevant legal issues related to the granting of IPR protection to inventions and works derived from artificial intelligence. The question then becomes how the legal protection of artificial intelligence inventions based on the law of intellectual property rights in Indonesia.

Research Methods

This research uses a normative juridical research method that involves three approaches, namely comparative, conceptual, and statutory. This method relies on the use of secondary data sources. Data analysis is done descriptively and qualitatively. This research has descriptive analytical research specifications, which aim to provide a comprehensive description of certain legal events that occur in society, then analyzed using relevant principles.

Discussion

Legal Principles of Ownership of Artificial Intelligence Works in Intellectual Property Rights

Article 27 of the Universal Declaration of Human Rights sets out the basis for the protection of Intellectual Property Rights, which protects the

¹⁰ Syahrial, "ASPEK HUKUM PENDAFTARAN HAK CIPTA DAN PATEN," *Greget* 13, no. 1 (2014), <https://doi.org/10.33153/grt.v13i1.543>.

¹¹ O.K Saidin, *Aspek Hukum Hak Kekayaan Intelektual (Intellectual Property Rights)* (Jakarta: Rajawali Pers, 2010).

¹² Nachshon Sean Goltz, Addison Cameron-Huff, dan Giulia Dondoli, "Rethinking Global-Regulation: world's law meets artificial intelligence,"

Information & Communications Technology Law 28, no. 1 (2 Januari 2019): 36–45, <https://doi.org/10.1080/13600834.2019.1557400>.

¹³ Truby dan Brown, "Human digital thought clones: the Holy Grail of artificial intelligence for big data."

"Moral and Material Interests" of scientific, artistic, and literary writings. Considered a matter of property rights, ownership of intellectual property rights allows creators and owners of copyrights, patents, and trademarks to be rewarded for their creative efforts and innovations.¹⁴ If there were no benefits from international agreements such as the Patent and Copyright Treaty, the 1883 Paris Convention, and the 1886 Berne Convention, the incentive for creators, inventors, and researchers to create and manufacture high-quality products for public consumption would be greatly reduced. Since artificial intelligence is only considered as a tool for human creation and innovation within the current IPR framework, the existing patent and copyright system covers and lays out requirements relating to the ownership, protection, and regulation of artificial intelligence. However, as it currently exists, the system prohibits and does not provide an enabling policy environment for the ownership and invention of artificial intelligence.¹⁵

The natural rights theory considers that everyone has natural property rights over their ideas in support of intellectual property rights. In fact, the efforts and creativity of the creator are the source of the creation. John Lock's idea that an author naturally has the right to create their intellectual work is the basis of this theory. In other words, this theory is an adjustment between intellectual property and traditional tangible property.¹⁶ The rights to use, prohibit others from using, and transfer owned goods fall under this category.

Therefore, in my simplification of this very complex legal and philosophical theory, infringing on someone's intellectual property rights is considered intellectual theft.¹⁷

However, it is clear that this theory is inconsistent because intellectual rights are based on things that cannot be taken away naturally and cannot be rivaled. Indeed, we can only take them because there is intervention from the authorities. Moreover, this theory is incomplete as Lock does not expand on the level of labor required to qualify something as property and also, whether the property on which labor is poured should be identifiable as that individual's property. Moreover, it seems that this justification denies the fact that most creations are made not only from the intellectual labor of the creator but also from unusable resources. In such situations, intellectual property is rarely created out of nothing.¹⁸

Philosophically, moral rights have existed before economic rights, and the recognition of moral rights is a form of legal protection for creators.¹⁹ Philipus M. Hadjon then explained that legal protection is about human honor and dignity, which also includes recognition of human rights.²⁰ Based on history, doctrine, and legislation, intellectual property law has recognized a certain relationship between the creator and the results of his intellectual activity.²¹ The copyright law regime has always been intended to protect creators in order to obtain their economic benefits, which are also intended to improve the welfare of the

¹⁴ Laina Rafianti dan Qoliqina Sabrina, "Perlindungan bagi Kustodian Ekspresi Budaya Tradisional Nadran Berdasarkan Perspektif Hukum Internasional dan Hukum Hak Kekayaan Intelektual di Indonesia," *PADJADJARAN Jurnal Ilmu Hukum (Journal of Law)* 1 (1 Desember 2014): 498–521, <https://doi.org/10.22304/pjih.v1n3.a5>.

¹⁵ Aceng Wahid, "Hak Kekayaan Intelektual Pada Hasil Karya Mahasiswa Dalam Bidang Teknologi Informasi," 26 Desember 2019.

¹⁶ Rahmadany Rahmadany dan Yusriana Yusriana, "Perlindungan Hukum Terhadap Pengetahuan Tradisional Sebagai Hak Kekayaan Intelektual," *Juripol* 5 (20 Agustus 2022): 160–69, <https://doi.org/10.33395/juripol.v5i2.11707>.

¹⁷ Taufik Simatupang, "Hak Asasi Manusia dan Perlindungan Kekayaan Intelektual dalam Perspektif Negara Hukum," *Jurnal HAM* 12 (22 April 2021): 111, <https://doi.org/10.30641/ham.2021.12.111-122>.

¹⁸ Riki Gunawan, "Kekayaan intelektual bagi startup di Indonesia dalam upaya perlindungan hukum hak kekayaan intelektual (HAKI) pada produk ekonomi kreatif (ekraf).," 22 Oktober 2020.

¹⁹ R. Diah Imaningrum Susanti, *Hak Cipta Kajian Filosofis Dan Historis* (Malang: Setara Press, 2017).

²⁰ Philipus M. Hadjon, *Perlindungan Hukum Bagi Rakyat Di Indonesia* (Peradaban, 2007).

²¹ Anna Dmytruk, "Intellectual property law as a system of creative activity results protection," *Theory and Practice of Intellectual Property*, 16 Juni 2021, 73–80, <https://doi.org/10.33731/62020.233967>.

creators.²²

Copyright can be interpreted as intellectual property sourced from the creative process through the ability of human thinking with real expression in various forms and has economic value that prosper the community.²³ In line with that, Law No. 28 of 2014 on Copyright explains that copyright has the broadest scope of object protection because it covers the fields of science, art and literature, it is alleged to have a strategic role in supporting the development of the nation and promoting the general welfare.²⁴ This resulted in the term limitations and exceptions in copyright law, as noted by Martin Stentfleben who in his thesis concludes that the use of copyright is permitted even without the authorization of the owner up to the point of no compensation, with several considerations such as access to education, equality, market failure, and freedom of speech.²⁵ With Copyright and Sui generis protection applied to computer programs, which are limited to the rights to expression, preventing the extraction and reutilization of the database in whole or in large part, which is basically a good policy prescription.²⁶ However, the important question is how the protection mechanism against competition is ineffective without strict rules. According to Article 2 of the Berne Convention, computer programs are considered literary works.²⁷ This protection applies to computer programs in any form. Most copyright laws in EU

member states rely on human-centered notions such as the beneficiary of protection, i.e. the author who possesses the conditions of protection, such as originality, and the rights granted, i.e. economic rights and moral rights.²⁸

The concept of ownership in the context of intellectual property is based on the concept of ownership or exclusive rights to property.²⁹ As such, creations of the mind are property granted or assigned to the creator, inventor, or, in some cases, to an entity. Invention patents, geographical indications, industrial designs, trademarks, and copyrights are all owned by.³⁰ According to the 1883 Paris Convention, ownership rights grant the inventor or creator commercial benefits such as bargaining power, market exclusivity, and licensing power. Therefore, there is often confusion between ownership and invention.³¹

The concept of inventory is based on the owner's involvement in the inventive process, from conceptual research, design, and creative discovery. Entities may also receive inventory rights based on agreements between the entity and employees regarding intellectual property rights relating to technology derived from the employees' work.³² The rights granted by the Paris Convention are also utilized by inventors. The concept of authorship refers to the economic and moral rights granted to authors, publishers, or artists of literary and artistic works as a contribution to the public.

²² Agus Sardjono, *Membumikan HKI di Indonesia* (Bandung: Nuansa Aulia, 2009).

²³ Sudjana, "Pembatasan Perlindungan Kekayaan Intelektual (Hak Cipta) dalam Perspektif Hak Asasi Manusia," *Jurnal HAM* 1, no. 10 (2019), <https://ejournal.balitbangham.go.id/index.php/ham/article/view/515>.

²⁴ Syarifah Mahila and Tresya, "Perlindungan Hak Cipta Seni Batik Jambi Kreasi Modifikasi Di Kota Jambi," *Wajah Hukum* 4, no. 1 (2020): 141–50, <http://dx.doi.org/10.33087/wjh.v4i1.178>.

²⁵ Martin Stentfleben, *Copyright, Limitations and Three Step Test in International and EC Copyright Law* (Den Haag: Kluwer, 2003).

²⁶ Avisa Fabrianne dan Yugih Setyanto, "Upaya Humas Direktorat Jenderal Kekayaan Intelektual dalam Membangun Kesadaran Hak Cipta," *Prologia* 2 (26 April 2019): 257, <https://doi.org/10.24912/pr.v2i2.3585>.

²⁷ Amanda Lubis, "Perlindungan Hukum Terhadap Karya Cipta Program Komputer Menurut Undang-Undang No 19 Tahun 2002 Tentang Hak Cipta," 8 Juli 2023.

²⁸ Yoyo Arifardhani, "Problematisasi Lembaga Manajemen Kolektif Nasional (LMKN) Dalam Menghimpun Royalti Hak Cipta Di Indonesia," *SALAM:*

Jurnal Sosial dan Budaya Syar-i 9 (23 Mei 2022): 865–72, <https://doi.org/10.15408/sjsbs.v9i3.26065>.

²⁹ Kholis Roisah, "KEBIJAKAN HUKUM 'TRANSFERABILITY' TERHADAP PERLINDUNGAN HAK KEKAYAAN INTELEKTUAL DI INDONESIA," *LAW REFORM* 11 (30 September 2015): 241, <https://doi.org/10.14710/lr.v1i1i2.15772>.

³⁰ Abdullah Sulaiman, "MEKANISME HUKUM PENGUPAHAN BURUH PERUSAHAAN SWASTA ERA GLOBALISASI DI INDONESIA," *Hukum Pidana dan Pembangunan Hukum* 2 (27 Agustus 2020), <https://doi.org/10.25105/hpph.v2i1.7698>.

³¹ Riki Manulang, *Desain Industri Sebagai Seni Terapan Dilindungi Hak Kekayaan Intelektual*, 2019, <https://doi.org/10.31219/osf.io/q6v84>.

³² Lily Dewi dan Putu Landra, "PERLINDUNGAN PRODUK-PRODUK BERPOTENSI HAK KEKAYAAN INTELEKTUAL MELALUI INDIKASI GEOGRAFIS," *Kertha Semaya : Journal Ilmu Hukum* 7 (17 Januari 2019): 1, <https://doi.org/10.24843/KM.2019.v07.i03.p02>.

These rights allow them to protect, transfer, authorize, license, and preclude the use of their works or intellectual creations by others.³³ However, exceptions are made for public reproduction and communication, such as in academic and scientific activities.

The 1883 Paris Convention on the Protection of Industrial Property establishes the basis and possibility to address the question of the feasibility of granting rights to artificial intelligence inventions within certain limits with respect to restrictions or prohibitions on inventors. From an anti-prohibition perspective, it can assist AI individuals and groups in addressing issues and taking necessary steps for policy reform in the global IPR system.³⁴ Some errors in the administrative notice and application instructions relating to patent cooperation agreements for patent applications of artificial intelligence inventions: (1) the rapid and widespread development of AI technology makes it difficult to cover all instances of AI applications; (2) there is no specific purpose for patenting AI, AI-enabled technologies, or AI-applied techniques.³⁵

Since Trade-Related Aspects of Intellectual Property Rights (TRIPS) is committed to protecting and enforcing intellectual property rights specifically to promote technological innovation, it does not yet cover all inventions and works of artificial intelligence. The minimum substantive standards for IPR protection and remedies for pharmaceutical patents do not provide an enabling policy environment to increase the productivity of new technological output and IPR in the form of patents, copyrights, trademarks, and other types of technology. From

the point of view of developing and least developed countries, the TRIPS Agreement is unfavorable to access and benefit from artificial intelligence-driven outputs or pharmaceutical-related products during emergency situations through the use of necessary licenses.³⁶ This is in direct contradiction to the objectives of TRIPS which aims to promote access to medicines for all. This causes the people of developing countries to lose their welfare. Developing countries face great challenges when they have to implement the agreement until 2021, despite a temporary moratorium and some important flexibilities. However, it should be noted that the TRIPS Agreement has enhanced multilateral liberalization and strengthened the protection of pharmaceutical inventions in a non-discriminatory manner.³⁷

Legal Protection of Artificial Intelligence Inventions Under Indonesian Intellectual Property Rights Law

The media has broadcasted that artificial intelligence is being used to generate news, compose music, create artwork-some of which has been auctioned-and produce scripts. In fact, artificial intelligence has been used to produce technical inventions that would be patentable if they were made by humans.³⁸ Recent achievements in the field of artificial intelligence have enabled machines to become more self-sufficient, which can make human participation in the creative and inventive process unnecessary. This makes it possible to enter an era where machines will not only assist humans in their creativity, but will also help in making their own

³³ Zainul Amin, "PENEGAKAN HUKUM TERHADAP HAK CIPTA DALAM BIDANG INDUSTRI KREATIF DI NEGARA KESATUAN REPUBLIK INDONESIA," *Mimbar Keadilan*, 7 September 2018, <https://doi.org/10.30996/mk.v0i0.1609>.

³⁴ Andan Mukminat, "PROBLEMATIKA HUKUM PEER TO PEER LENDING SYARIAH DI INDONESIA," *Jurnal Hukum dan Pembangunan Ekonomi* 10 (29 Desember 2022): 168, <https://doi.org/10.20961/hpe.v10i2.64922>.

³⁵ Haikal Haikal dan Haikal Yunus, "Perkembangan Terkini dalam Teknologi Kecerdasan Buatan," 6 Juli 2023.

³⁶ Safril Sanib, "Ketentuan-ketentuan TRIPS-Plus dalam Kerangka Perjanjian Perdagangan Bebas," *Halu Oleo Law Review* 3 (28 Maret 2019): 50, <https://doi.org/10.33561/holrev.v3i1.6016>.

³⁷ Erika Setyoningsih, "Implementasi Ratifikasi Agreement on Trade Related Aspects of Intellectual Property Right (Trips Agreement) terhadap Politik Hukum di Indonesia," *Jurnal Penegakan Hukum dan Keadilan* 2 (25 November 2021): 117–29, <https://doi.org/10.18196/jphk.v2i2.11749>.

³⁸ Haikal dan Yunus, "Perkembangan Terkini dalam Teknologi Kecerdasan Buatan."

needs met.³⁹ The question of applying the IPR legal framework to works and inventions produced or created by artificial intelligence is complex. This relates primarily to: (a) copyright and sui generis rights and other rights related thereto; and (b) patent law.⁴⁰

The main purpose of the copyright system is to provide creators with property rights that are broader than the rights granted by the contract system which is based on economic and legal principles.⁴¹ The production of useful artworks will increase if property rights are granted to creators, which encourages artists to create, perform, develop and disseminate their work, which in turn improves the overall welfare of society.⁴² However, other entities are entitled to copyright as a direct regulator of the actual human creator because of the relationship or contract with the author or creator.⁴³ AI systems do not need incentives to create art. Therefore, the nature of incentives is still necessary to: (1) encourage the development of AI system programming; and (2) encourage entities to control the operation of AI systems and take responsibility for the results.⁴⁴ In this case, ownership may be the best way to incentivize this. However, it is not necessary to encourage robots or AI systems to function properly, which will benefit society.⁴⁵

With the development of AI and new technologies, scientific publications in fields such as pharmaceuticals, machine learning, and

telecommunications have increased rapidly. However, it remains difficult to ensure compliance as copyrights for literary and artistic works are protected by law. Copyright laws for works created by artificial intelligence in some countries such as the UK, South Africa, Hong Kong, India, Ireland, and New Zealand, have enacted laws that protect computer-generated works.⁴⁶ The necessary arrangements for such works will receive this protection. A computer-generated work is defined in the UK as "created by a computer in circumstances where there is no human creator of the work." Keep in mind that the UK provision allows the programmer or user to have ownership. As far as I am aware, case law relating to computer-generated works is still very sparse.⁴⁷ In terms of copyright, these works have a shorter term of protection, approximately fifty years, compared to seventy years for other copyrighted works. The inconsistent system and lax nature of enforcement at the multilateral level contribute negatively to strict compliance.⁴⁸

Then, AI systems as computer programs have the same copyright as original software. However, the ideas and principles underlying the computer program are not protected due to copyright.⁴⁹ Only the original expression of the computer program is protected. Therefore, "to the extent that logic, algorithms, and programming languages consist of ideas and principles, such ideas and principles are

³⁹ Sri Yunita dkk., "IMPLIKASI TEKNOLOGI ERA DIGITAL TERHADAP TRANSFORMASI PENDIDIKAN DI SIDEREJO HILIR KACAMATAN MEDAN TEMBUNG SUMATERA UTARA," *Jurnal Dharma Agung* 31 (26 April 2023): 745, <https://doi.org/10.46930/ojsuda.v31i1.3083>.

⁴⁰ Anak Paramisuari dan Sagung Purwani, "PERLINDUNGAN HUKUM EKSPRESI BUDAYA TRADISIONAL DALAM BINGKAI REZIM HAK CIPTA," *Kertha Semaya: Journal Ilmu Hukum* 7 (17 Januari 2019): 1, <https://doi.org/10.24843/KM.2018.v07.i01.p04>.

⁴¹ I Gede Winatha dkk., "Analisis Kepastian Hukum Pengetahuan Tradisional Dan Ekspresi Budaya Tradisional Sebagai Bagian Hak Kekayaan Intelektual," *Jurnal Ilmiah Raad Kertha* 6 (27 Februari 2023): 34–48, <https://doi.org/10.47532/jirk.v6i1.824>.

⁴² Fanni Rahmawati, "Pilar-Pilar Yang Mempengaruhi Perkembangan Ekonomi Kreatif Di Indonesia," *Economic Education and Entrepreneurship Journal* 4 (21 November 2021): 159–64, <https://doi.org/10.23960/E3J/v4i2.159-164>.

⁴³ Rachmayani Dewi, "PERJANJIAN LISENSI HAK CIPTA ATAS LAGU ANTARA PENCIPTA LAGU DENGAN PRODUSER REKAMAN

DALAM UPAYA KEPASTIAN HUKUM PERLINDUNGAN HAK EKONOMI PARA PIHAK," *Syar Hukum: Jurnal Ilmu Hukum* 16 (20 November 2019), <https://doi.org/10.29313/sh.v16i2.4883>.

⁴⁴ Suman Punia, *Artificial Intelligence And Intelligence Systems*, 2023.

⁴⁵ Rony Zebua dkk., *FENOMENA ARTIFICIAL INTELLIGENCE (AI)*, 2023.

⁴⁶ I Nata dkk., "Smart Project Educational Robot (SpaceR) Sebagai Robot Edukasi," *Jurnal Aplikasi dan Inovasi Iptek (JASINTEK)* 3 (31 Oktober 2021): 56–64, <https://doi.org/10.52232/jasintek.v3i1.63>.

⁴⁷ muhammad Noho Dkk., "Analisis Perbandingan Pengaturan Hukum Build Operate Transfer (Bot) Di Indonesia Dengan Negara-Negara Asean," *JURNAL USM LAW REVIEW* 4 (24 November 2021): 728, <https://doi.org/10.26623/julr.v4i2.4282>.

⁴⁸ Widya Sinambela, "Perlindungan Hukum Atas Hak Cipta Karya Musik Dan Lagu (Putusan Pengadilan Niaga No.02/Hak Cipta/2005/PN.Niaga/Mdn)," 8 Juli 2023.

⁴⁹ Endhar Frayoga, "Tindak Pidana Pembajakan Perangkat Lunak (Software) Komputer Dikaitkan Dengan Hak Cipta Dan Upaya Penanggulangannya," 8 Juli 2023.

not protected".⁵⁰ As a result, only expressions are copyrighted to the point that the basic idea of the algorithm cannot be protected, but the original code of the algorithm can be protected.⁵¹ Since the current IPR system does not give dual status to the work of AI, whether it is created independently or with the help of humans, the resulting invention or work is ascribed to the programmer. AI cannot own patents or copyrights.⁵²

In the field of technology, a patent is an exclusive right granted by the state to inventors to carry out their own inventions or give consent to other parties to carry them out. And an invention is an inventor's idea applied to solve a specific technological problem, such as a product or process, or the improvement and development of a product or process.⁵³ Article 2 and 3 of Law No. 13/2016 on Patents divides the scope of patent protection into two, dividing them into patents and simple patents.⁵⁴ A simple patent is granted for a new invention that contains an inventive step and can be applied in industry, while a simple patent is granted for any new invention that is a development of an existing product or process and can be applied in industry.⁵⁵ According to Article 1 Paragraph (1) of Law Number 13 Year 2016 on Patents, the object of patent protection is technological innovation. In accordance with the definition of invention in Article 1 paragraph 2 of Law Number 13 Year 2016 on Patents, products, processes, and the improvement and development

of such products or processes fall within the scope of this type of invention.⁵⁶

Since the Artificial Intelligence invention is a physical entity or object in the form of software, the Artificial Intelligence invention can be classified as a software product patent.⁵⁷ Since artificial intelligence is a part of computer programs, it can be used in various existing operating systems. Algorithms written in programming languages have source code (input), certain technical effects, and the ability to think and act like humans. The algorithm is what makes a computer program have person-like abilities. Hence, the algorithm can be patented as a process patent as it is a process or method to make a computer program have people-like abilities.⁵⁸

In Article 4 letter (d) of Law Number 13 Year 2016 on Patents, Algorithm is mentioned as one of the computer program innovations that can be patented in Indonesia. In its explanation, an Algorithm is described as a finite set of well-defined instructions to compute a function. These instructions describe a computation that, after starting with an initial condition and an initial input that may be empty, is processed through a clearly defined sequence of finite conditions, ultimately producing an "output" and stopping at the final condition.⁵⁹

A process patent for an artificial intelligence invention algorithm is granted to a person who has licensed an artificial intelligence invention.⁶⁰

⁵⁰ Abdul Atsar, *Perlindungan Hukum Terhadap Inovasi Di Bidang Teknologi Informasi Dan Komunikasi Sebagai Salah Satu Upaya Meningkatkan Kesejahteraan Masyarakat Di Indonesia*, 2017, <https://doi.org/10.31227/osf.io/uwv29>.

⁵¹ Budi Prasetyo, "Pertanggungjawaban Pidana Pelanggaran Hak Cipta Terhadap Ciptaan Yang Dilindungi Dalam Uu No.19 / 2002 (Studi Kasus NO.3683/PID.B/2008/PN.MDN)," *Judge: Jurnal Hukum* 2 (12 Februari 2021): 8–16, <https://doi.org/10.54209/judge.v2i02.57>.

⁵² Desi Ratnasari, *Persyaratan Pendaftaran Hak Paten Untuk AplikASI*, 2018, <https://doi.org/10.31219/osf.io/z3t4m>.

⁵³ Valerie Kaulica dan Muhamad Amirulloh, "Perlindungan Hukum Terhadap Kepemilikan Paten Oleh Karyawan Bumn Di Indonesia," *Jurnal Suara Keadilan* 21 (22 Desember 2020): 73–85, <https://doi.org/10.24176/sk.v21i1.5683>.

⁵⁴ Tasya Ramli dan Sheryl Putri, "Tinjauan Hukum Perbedaan Pengalihan Hak Paten Dengan Perjanjian Lisensi Pada Hukum Perdata," *Dialogia Iuridica: Jurnal Hukum Bisnis dan Investasi* 10 (30 November 2018): 96–100, <https://doi.org/10.28932/di.v10i1.1012>.

⁵⁵ Murti Ningsih, *Prosedur Penggunaan Hak Paten Oleh Orang Awam Dan Profesional*, 2018, <https://doi.org/10.31219/osf.io/g4c9u>.

⁵⁶ Satrianah, *Syarat-Syarat Dan Kriteria Penyelenggaraan Hak Paten Berdasarkan Undang-Undang*, 2018, <https://doi.org/10.31219/osf.io/8xcva>.

⁵⁷ Arga Audiya, *Paten Sebagai Riset Pendukung Yang Relevan Dalam Revolusi Industri 4.0.*, 2019, <https://doi.org/10.31219/osf.io/d9cbe>.

⁵⁸ Shely Cathrin dan Reno Wikandaru, "The future of character education in the era of artificial intelligence," *Humanika* 23 (1 April 2023): 91–100, <https://doi.org/10.21831/hum.v23i1.59741>.

⁵⁹ Asri Sarif dan I Gede Winatha, "Regulation of Patent Protection of Computer Programs as Inventions in Indonesia | 122 Regulation of Patent Protection of Computer Programs as Inventions in Indonesia," *Indonesia Law Reform Journal* 3 (3 Juni 2023): 122–31, <https://doi.org/10.22219/ilrej.v3i1.25940>.

⁶⁰ Hindarto Hindarto, Sumarno Sumarno, dan Mochamad Rosid, *Buku Ajar Kecerdasan Buatan/Artificial Intelligent (AI)*, 2022, <https://doi.org/10.21070/2022/978-623-464-034-2>.

Furthermore, the individual can develop or improve the algorithm to produce an artificial intelligence product that is more sophisticated than the previous one or includes. Based on the above, an inventor must determine whether the artificial intelligence invention is an inventive step or merely a development of an existing process or product. In this way, an inventor can determine whether the invention can be protected as a patent or only as a simple patent.⁶¹

Accordingly, an automated process comprises algorithms, AI applications, database structures, algorithms, and process results. AI inventions produce output autonomously or semi-autonomously without human involvement.⁶² The basic principle held by the European Union and other organizations is that patents are made to protect humans and that the patent system will instantly change when patent rights are granted to Artificial Intelligence Systems and protected.⁶³ Then, artificial intelligence systems and machines that lack human inventory valuation and patent ownership rights should be thoroughly and critically discussed and evaluated before accepting them due to legal, regulatory, security, and ethical ramifications.⁶⁴

Looking at today's patentable machines from a utopian perspective is the process that takes place from the inception of the idea and development until the patent examining authority decides to

deny the patent, which is legally embedded in the patent law.⁶⁵ However, AI inventorship has been rejected repeatedly. Due to the current law, artificial intelligence systems cannot act as inventors or as designers. As such, an invention is a human activity involving a contribution to an inventive concept, so the inventor is the first owner of any patent applied for and granted for the invention.⁶⁶ Since this is a well-established precedent, it does not matter how much human or machine involvement there is, as the inventor remains fixed by the theory of natural rights in patent law. As there is no well-known practice or judgment, the question of the well-established legal fiction pertaining to the user or owner of an AI system as the creator has no definitive answer.⁶⁷ Artificial intelligence inventions, which are essentially computer programs, meet the requirements of patentability, which means that they must be novel, inventive, and applicable in industry. Thus, artificial intelligence inventions fall within the scope of patent protection rather than just computer programs,⁶⁸ and if the artificial intelligence invention is only a development, the invention is protected by a simple patent for ten years.⁶⁹ Simple patents are granted on application and can only be filed for a single invention or standalone claim; cannot file patents that are divided into parts.⁷⁰

In relation to that, Article 19 of Law No. 13/2016

⁶¹ Mochammad Ribwo dan Kholis Raisah, "Perlindungan Hukum Terhadap Paten Sederhana Dalam Sistem Hukum Paten Di Indonesia (Studi Komparasi Dengan Sistem Hukum Paten Di Negara China)," *NOTARIUS* 12 (11 Juni 2019): 42, <https://doi.org/10.14710/nts.v12i1.23761>.

⁶² Imam Machdi dkk., "Implementasi Big Data dan Kecerdasan Artifisial untuk Statistik Oficial," 2023, <https://doi.org/10.55981/brin.668.c538>.

⁶³ Langit Rafi Dan Rianda Dirkareshza, "Urgensi Penegakan Hukum Hak Cipta Terhadap Pembuat Konten Dalam Penggunaan Lagu Di Media Sosial The Urgence Of Copyright Law Enforcement On Content Makers In Using Song On Social Media," *Jurnal Usm Law Review* 4 (1 November 2021): 615, <https://doi.org/10.26623/Julr.V4i2.4005>.

⁶⁴ Abdul Hakim Dkk., "Analisis Pandangan Masyarakat Awam Terhadap Manajemen Sistem Informasi Global," *Journal Of Management And Creative Business* 1 (20 Desember 2022): 86–94, <https://doi.org/10.30640/Jmcbus.V1i1.498>.

⁶⁵ Boru Sumarna, "Peluang Mahasiswa Dan Dosen Untuk Mengajukan Permohonan Hak Paten (Uu No.13 Tahun 2016 Tentang Hak Paten)," *Jurnal Hukum Replik* 6 (1 Maret 2018): 121, <https://doi.org/10.31000/Jhr.V6i1.1180>.

⁶⁶ Yopy Dewanti Dkk., "Motivasi Remaja Unggulan Di Era Revolusi Industri 4.0 Dan Society 5.0 (Bersama Sma Tunas Markatin)," *Abdimas Awang Long* 6 (22 Januari 2023): 7–13, <https://doi.org/10.56301/Awal.V6i1.660>.

⁶⁷ Wahyu M.H., "Optimalisasi Penarikan Dan Pendistribusian Royalti Hak Cipta Oleh Lembaga Manajemen Kolektif Nasional," *Wicarana* 1 (28 September 2022): 93–104, <https://doi.org/10.57123/Wicarana.V1i2.25>.

⁶⁸ Hibah Alessa, "The role of Artificial Intelligence in Online Dispute Resolution: A brief and critical overview," *Information & Communications Technology Law* 31, no. 3 (2 September 2022): 319–42, <https://doi.org/10.1080/13600834.2022.2088060>.

⁶⁹ Thomas Allen, "Review of the third National Conference on Law, computers and artificial intelligence," *Information & Communications Technology Law* 1, no. 2 (1 Januari 1992): 247–52, <https://doi.org/10.1080/13600834.1992.9965654>.

⁷⁰ Bronwyn H. Hall dan Christian Helmers, "The impact of international patent systems: Evidence from accession to the European Patent Convention," *Research Policy* 48, no. 9 (2019): 103810, <https://doi.org/10.1016/j.respol.2019.103810>.

on Patents regulates the rights and obligations of patent holders. Product patents cover the manufacture, use, sale, importation, leasing, delivery, or making available for sale, lease, or delivery of patent-protected goods. Process patents cover the use of a patent-protected production process to make goods or other acts. Moreover, it is not clear from a legal, technical, and policy standpoint what constitutes an invention made by AI or assisted by AI.⁷¹ However, inventions performed with AI or those assisted by AI and using AI as a tool or method in the development of data concepts used in machine learning modeling to make data-driven predictions based on input and output data as another important component of algorithm development.⁷² Learning data is engineered during the discovery process so that the computer can identify patterns and cross-validate data to ensure the effectiveness and accuracy of the algorithm. Increasingly complex self-learning systems (algorithms) are becoming part of everyday life. These can produce creative or innovative results. Therefore, there would seem to be invention and creativity without significant human contributions.

With respect to Trade-related Aspects to Intellectual Property Rights (TRIPS) which is outdated and irrelevant to the development and advancement of new technologies and artificial intelligence. The notion of "artificial inventor" refers to AI or artificial systems that have the ability to autonomously generate quality- and safety-driven inventions, which are protected by patent and copyright laws of artistic creations/works.⁷³ In the public interest, AI proponents argue that the IPR system should be

changed to support AI with no counterproductive and anti-competitive policy restrictions that limit non-incentivized contributions and progress. In contrast, anti-AI argues that the system should remain as it is to protect human creativity from the potentially life-threatening and disfiguring consequences of technological advancement as well as the possible extinction of humanity through Artificial Intelligence.⁷⁴

To date, there are no specific laws prohibiting the copyright of inventions and works produced by artificial intelligence.⁷⁵ However, there are indications that the laws in most countries such as the United States, United Kingdom, Australia, Canada, European Union, and other countries cannot accept non-human copyrights.⁷⁶ In fact, artificial intelligence systems are increasingly surpassing human intelligence. Moreover, the ethical dilemmas that arise as a result of AI development are complex. It is imperative to consider these issues in order to look at broader societal issues. There is no one perfect theory or framework to determine whether artificial intelligence is good or harmful.

There is no doubt that AI technologies have a significant influence on the existing IPR system and all aspects of society. However, the future of AI innovations within the IPR infrastructure remains unclear, and there are many uncertain and ambiguous regulations on which AI inventions and works-including AI systems and software/programs-should be granted copyright, or ownership. Policymakers, legislators, experts, and academics are discussing changes to the overall patent and copyright laws, eligibility requirements for patents, copyrights, and related IPR subjects, and jurisdictional reforms and

⁷¹ Goltz, Cameron-Huff, dan Dondoli, "Rethinking Global-Regulation: world's law meets artificial intelligence."

⁷² Jasper Doomen, "The artificial intelligence entity as a legal person," *Information & Communications Technology Law*, 22 April 2023, 1–11, <https://doi.org/10.1080/13600834.2023.2196827>.

⁷³ Rafael Dean Brown, "Property ownership and the legal personhood of artificial intelligence," *Information & Communications Technology Law* 30, no. 2 (4 Mei 2021): 208–34, <https://doi.org/10.1080/13600834.2020.1861714>.

⁷⁴ Goltz dan Dondoli, "A note on science, legal research and artificial intelligence."

⁷⁵ Mohammad Bashayreh, Fadi N. Sibai, dan Amer Tabbara, "Artificial intelligence and legal liability: towards an international approach of proportional liability based on risk sharing," *Information & Communications Technology Law* 30, no. 2 (4 Mei 2021): 169–92, <https://doi.org/10.1080/13600834.2020.1856025>.

⁷⁶ Brasil, "Rules and Principles in Legal Reasoning. A Study of Vagueness and Collisions in Artificial Intelligence and Law."

policies on the application of works of artificial intelligence. To meet the demands of these new and evolving technologies, the current rules on ownership, invention, and intellectual property rights for AI inventions and creations must be updated. It is undeniable and irreversible that Artificial Intelligence, widely regarded as the Fourth Industrial Revolution, will change the way intellectual property arrangements are conducted and the exercise of rights over Artificial Intelligence inventions and works.⁷⁷

Two main arguments stand behind the debate on the inclusivity of Artificial Intelligence in the IPR System. First, is that there is no reason to change the current IPR laws as they promote and encourage human creativity, and any attempt to change them would undermine this basic objective. Moreover, granting AI ownership, invention, and authorship rights creates legal, regulatory, and social uncertainties that may jeopardize human well-being. Second, is that the current IPR law should be updated and changed to fully enable AI inventions and innovations. This is because AI doesn't need human incentives to create or make things, and if AI is given ownership rights, copyrights, and authorship rights, creativity and innovation of better products for humans to consume and use.

Judicial regulation of intellectual property law may be affected by social uncertainty and legal ambiguity about the nature and dynamics of Artificial Intelligence as a creator or inventor, which is what AI systems have in common.⁷⁸ However, the current intellectual property system does not accept AI as a whole. Most countries do not recognize the ownership of AI works, so if we do not update our IPR laws and systems, we risk a lack of incentives for innovation and creativity, which are essential for the well-being of society. Consequently, to address Artificial Intelligence as

a whole within the framework of the IPR System, collective interventions at the multilateral, regional, and national levels are required. Hence, stakeholders in the existing IPR infrastructure must take necessary actions to amend, adapt, and accommodate well-guided policy formulations to incorporate AI inventions with social, ethical, and human safety in mind. This includes the creation, enactment, and amendment of new and existing laws and policies to address the issue of ownership of AI works.

Conclusion

Therefore, the author concludes that according to Article 27 paragraph (1) of TRIPs, inventions in any field of technology can be protected and regulated in the same way as artificial intelligence (AI) inventions. Thus, the responsibilities and rights of patent holders are regulated in Article 19 of Law No. 13/2016 on Patents explaining that product patents cover the manufacture, use, sale, importation, leasing, delivery, or provision of patent-protected products for sale, lease, or delivery. A process patent covers the use of a patent-protected production process to make a product or other act. Moreover, it is not clear from a legal, technical, and policy standpoint what constitutes an invention made by AI or assisted by AI. However, such inventions and the use of AI as a tool or method in the development of data concepts, which are used in machine learning modeling to make data-driven predictions based on input and output data, are essential components of algorithm development. Thus, stakeholders in the existing IPR infrastructure should take necessary actions to amend, adapt, and accommodate well-guided policy formulations to incorporate AI inventions with social, ethical, and human safety in mind. This includes the creation, enactment, and amendment

⁷⁷ Goltz, Cameron-Huff, dan Dondoli, "Rethinking Global-Regulation: world's law meets artificial intelligence."

⁷⁸ Maria Lada, "Artificial intelligence, inventorship and the myth of the inventing machine: Can a process be an inventor?," *Information &*

of new and existing laws and policies to address the issue of ownership of AI works.

Bibliography

- Alessa, Hibah. “The role of Artificial Intelligence in Online Dispute Resolution: A brief and critical overview.” *Information & Communications Technology Law* 31, no. 3 (2 September 2022): 319–42. <https://doi.org/10.1080/13600834.2022.2088060>.
- Allen, Thomas. “Review of the third National Conference on Law, computers and artificial Intelligence.” *Information & Communications Technology Law* 1, no. 2 (1 Januari 1992): 247–52. <https://doi.org/10.1080/13600834.1992.9965654>.
- Amin, Zainul. “PENEGAKAN HUKUM TERHADAP HAK CIPTA DALAM BIDANG INDUSTRI KREATIF DI NEGARA KESATUAN REPUBLIK INDONESIA.” *Mimbar Keadilan*, 7 September 2018. <https://doi.org/10.30996/mk.v0i0.1609>.
- Arifardhani, Yoyo. “Problematisasi Lembaga Manajemen Kolektif Nasional (LMKN) Dalam Menghimpun Royalti Hak Cipta Di Indonesia.” *SALAM: Jurnal Sosial dan Budaya Syar-i* 9 (23 Mei 2022): 865–72. <https://doi.org/10.15408/sjsbs.v9i3.26065>.
- Atsar, Abdul. *PERLINDUNGAN HUKUM TERHADAP INVENSI DI BIDANG TEKNOLOGI INFORMASI DAN KOMUNIKASI SEBAGAI SALAH SATU UPAYA MENINGKATKAN KESEJAHTERAAN MASYARAKAT DI INDONESIA*, 2017. <https://doi.org/10.31227/osf.io/uwv29>.
- Audiya, Arga. *PATEN SEBAGAI RISET PENDUKUNG YANG RELEVAN DALAM REVOLUSI INDUSTRI 4.0.*, 2019. <https://doi.org/10.31219/osf.io/d9cbe>.
- Bashayreh, Mohammad, Fadi N. Sibai, dan Amer Tabbara. “Artificial intelligence and legal liability: towards an international approach of proportional liability based on risk sharing.” *Information & Communications Technology Law* 30, no. 2 (4 Mei 2021): 169–92. <https://doi.org/10.1080/13600834.2020.1856025>.
- Brasil, Samuel Meira. “Rules and Principles in Legal Reasoning. A Study of Vagueness and Collisions in Artificial Intelligence and Law.” *Information & Communications Technology Law* 10, no. 1 (1 Maret 2001): 67–77. <https://doi.org/10.1080/13600830124910>.
- Brown, Rafael Dean. “Property ownership and the legal personhood of artificial intelligence.” *Information & Communications Technology Law* 30, no. 2 (4 Mei 2021): 208–34. <https://doi.org/10.1080/13600834.2020.1861714>.
- Cathrin, Shely, dan Reno Wikandaru. “The future of character education in the era of artificial intelligence.” *Humanika* 23 (1 April 2023): 91–100. <https://doi.org/10.21831/hum.v23i1.59741>.
- Dewanti, Yopy, Dingot Sitanggang, Kania Farida, Arifin Setiabudi, M. Ferdinansyah, dan Ahmad Fadli. “Motivasi Remaja Unggulan Di Era Revolusi Industri 4.0 dan Society 5.0 (Bersama SMA Tunas Markatin).” *Abdimas Awang Long* 6 (22 Januari 2023): 7–13. <https://doi.org/10.56301/awal.v6i1.660>.
- Dewi, Lily, dan Putu Landra. “PERLINDUNGAN PRODUK-PRODUK BERPOTENSI HAK KEKAYAAN INTELEKTUAL MELALUI INDIKASI GEOGRAFIS.” *Kertha Semaya : Journal Ilmu Hukum* 7 (17 Januari 2019): 1. <https://doi.org/10.24843/KM.2019.v07.i03.p02>.
- Dewi, Rachmayani. “PERJANJIAN LISENSI HAK CIPTA ATAS LAGU ANTARA PENCIPTA LAGU DENGAN PRODUSER REKAMAN DALAM UPAYA KEPASTIAN HUKUM PERLINDUNGAN HAK

- EKONOMI PARA PIHAK.” *Syiar Hukum : Jurnal Ilmu Hukum* 16 (20 November 2019). <https://doi.org/10.29313/sh.v16i2.4883>.
- Dmytruk, Anna. “Intellectual property law as a system of creative activity results protection.” *Theory and Practice of Intellectual Property*, 16 Juni 2021, 73–80. <https://doi.org/10.33731/62020.233967>.
- Doomen, Jasper. “The artificial intelligence entity as a legal person.” *Information & Communications Technology Law*, 22 April 2023, 1–11. <https://doi.org/10.1080/13600834.2023.2196827>.
- Fabrianne, Avissa, dan Yugih Setyanto. “Upaya Humas Direktorat Jenderal Kekayaan Intelektual dalam Membangun Kesadaran Hak Cipta.” *Prologia* 2 (26 April 2019): 257. <https://doi.org/10.24912/pr.v2i2.3585>.
- Frayoga, Endhar. “Tindak Pidana Pembajakan Perangkat Lunak (Software) Komputer Dikaitkan Dengan Hak Cipta Dan Upaya Penanggulangannya,” 8 Juli 2023.
- Goltz, Nachshon Sean, Addison Cameron-Huff, dan Giulia Dondoli. “Rethinking Global-Regulation: world’s law meets artificial intelligence.” *Information & Communications Technology Law* 28, no. 1 (2 Januari 2019): 36–45. <https://doi.org/10.1080/13600834.2019.1557400>.
- Goltz, Nachshon (Sean), dan Giulia Dondoli. “A note on science, legal research and artificial intelligence.” *Information & Communications Technology Law* 28, no. 3 (2 September 2019): 239–51. <https://doi.org/10.1080/13600834.2019.1644065>.
- Gunawan, Riki. “Kekayaan intelektual bagi startup di indonesia dalam upaya perlindungan hukum hak kekayaan intelektual (HAKI) pada produk ekonomi kreatif (ekraf).,” 22 Oktober 2020.
- Hadjon, Philipus M. *Perlindungan Hukum Bagi Rakyat Di Indonesia*. Peradaban, 2007.
- Haikal, Haikal, dan Haikal Yunus. “Perkembangan Terkini dalam Teknologi Kecerdasan Buatan,” 6 Juli 2023.
- Hakim, Abdul, Ledis Harahap, Raisa Salsabila, dan Nurbaiti Nurbaiti. “ANALISIS PANDANGAN MASYARAKAT AWAM TERHADAP MANAJEMEN SISTEM INFORMASI GLOBAL.” *Journal of Management and Creative Business* 1 (20 Desember 2022): 86–94. <https://doi.org/10.30640/jmcbus.v1i1.498>.
- Hall, Bronwyn H., dan Christian Helmers. “The impact of international patent systems: Evidence from accession to the European Patent Convention.” *Research Policy* 48, no. 9 (2019): 103810. <https://doi.org/10.1016/j.respol.2019.103810>.
- Hindarto, Hindarto, Sumarno Sumarno, dan Mochamad Rosid. *Buku Ajar Kecerdasan Buatan/Artificial Intelegent (AI)*, 2022. <https://doi.org/10.21070/2022/978-623-464-034-2>.
- Kaulica, Valerie, dan Muhamad Amirulloh. “PERLINDUNGAN HUKUM TERHADAP KEPEMILIKAN PATEN OLEH KARYAWAN BUMN DI INDONESIA.” *Jurnal Suara Keadilan* 21 (22 Desember 2020): 73–85. <https://doi.org/10.24176/sk.v21i1.5683>.
- Khoirul Hidayah. *Hukum Hak Kekayaan Intelektual*. Malang: Setara Press, 2017.
- Lada, Maria. “Artificial intelligence, inventorship and the myth of the inventing machine: Can a process be an inventor?” *Information & Communications Technology Law*, 8 Desember 2022, 1–40. <https://doi.org/10.1080/13600834.2022.2154049>.
- Lee, Zhao Yan, Mohammad Ershadul Karim, dan Kevin Ngui. “Deep learning artificial

- intelligence and the law of causation: application, challenges and solutions.” *Information & Communications Technology Law* 30, no. 3 (2 September 2021): 255–82. <https://doi.org/10.1080/13600834.2021.1890678>.
- Lubis, Amanda. “Perlindungan Hukum Terhadap Karya Cipta Program Komputer Menurut Undang-Undang No 19 Tahun 2002 Tentang Hak Cipta,” 8 Juli 2023.
- Lui, Alison, dan George William Lamb. “Artificial intelligence and augmented intelligence collaboration: regaining trust and confidence in the financial sector.” *Information & Communications Technology Law* 27, no. 3 (2 September 2018): 267–83. <https://doi.org/10.1080/13600834.2018.1488659>.
- Machdi, Imam, Alfatihah Reno Maulani Nuryaningsih Soekri Putri Munaf, Arie Wahyu Wijayanto, Amanda Putra, dan Setia Pramana. “Implementasi Big Data dan Kecerdasan Artifisial untuk Statistik Oficial,” 2023. <https://doi.org/10.55981/brin.668.c538>.
- Manulang, Riki. *Desain Industri Sebagai Seni Terapan Dilindungi Hak Kekayaan Intelektual*, 2019. <https://doi.org/10.31219/osf.io/q6v84>.
- M.H., Wahyu. “OPTIMALISASI PENARIKAN DAN PENDISTRIBUSIAN ROYALTI HAK CIPTA OLEH LEMBAGA MANAJEMEN KOLEKTIF NASIONAL.” *WICARANA* 1 (28 September 2022): 93–104. <https://doi.org/10.57123/wicarana.v1i2.25>.
- Mukminati, Andan. “PROBLEMATIKA HUKUM PEER TO PEER LENDING SYARIAH DI INDONESIA.” *Jurnal Hukum dan Pembangunan Ekonomi* 10 (29 Desember 2022): 168. <https://doi.org/10.20961/hpe.v10i2.64922>.
- Nata, I, I Yasana, Kadek Setiawan, Si Sutamara, Gede Widiada, dan Ida Mardana. “Smart Project Educational Robot (SpaceR) Sebagai Robot Edukasi.” *Jurnal Aplikasi dan Inovasi Iptek (JASINTEK)* 3 (31 Oktober 2021): 56–64. <https://doi.org/10.52232/jasintek.v3i1.63>.
- Ningsih, Murti. *PROSEDUR PENGGUNAAN HAK PATEN OLEH ORANG AWAM DAN PROFESIONAL*, 2018. <https://doi.org/10.31219/osf.io/g4c9u>.
- Noho, Muhammad, Budi Santoso, Paramita Prananingtyas, dan Trinah Islami. “ANALISIS PERBANDINGAN PENGATURAN HUKUM BUILD OPERATE TRANSFER (BOT) DI INDONESIA DENGAN NEGARA-NEGARA ASEAN.” *JURNAL USM LAW REVIEW* 4 (24 November 2021): 728. <https://doi.org/10.26623/julr.v4i2.4282>.
- Paramisuari, Anak, dan Sagung Purwani. “PERLINDUNGAN HUKUM EKSPRESI BUDAYA TRADISIONAL DALAM BINGKAI REZIM HAK CIPTA.” *Kertha Semaya : Journal Ilmu Hukum* 7 (17 Januari 2019): 1. <https://doi.org/10.24843/KM.2018.v07.i01.p04>.
- Prasetyo, Budi. “PERTANGGUNGJAWABAN PIDANA PELANGGARAN HAK CIPTA TERHADAP CIPTAAN YANG DILINDUNGI DALAM UU NO.19 / 2002 (STUDI KASUS NO.3683/PID.B/2008/PN.MDN).” *Judge : Jurnal Hukum* 2 (12 Februari 2021): 8–16. <https://doi.org/10.54209/judge.v2i02.57>.
- Punia, Suman. *Artificial Intelligence And Intelligence Systems*, 2023.
- Rafi, Langit, dan Rianda Dirkareshza. “URGENSI PENEGAKAN HUKUM HAK CIPTA TERHADAP PEMBUAT KONTEN DALAM PENGGUNAAN LAGU DI MEDIA SOSIAL THE URGENCE OF COPYRIGHT LAW ENFORCEMENT ON CONTENT MAKERS IN USING SONG ON SOCIAL MEDIA.” *JURNAL USM LAW REVIEW* 4 (1 November 2021): 615.

- <https://doi.org/10.26623/julr.v4i2.4005>.
- Rafianti, Laina, dan Qoliqina Sabrina. "Perlindungan bagi Kustodian Ekspresi Budaya Tradisional Nadran Berdasarkan Perspektif Hukum Internasional dan Hukum Hak Kekayaan Intelektual di Indonesia." *PADJADJARAN Jurnal Ilmu Hukum (Journal of Law)* 1 (1 Desember 2014): 498–521. <https://doi.org/10.22304/pjih.v1n3.a5>.
- Rahmadany, Rahmadany, dan Yusriana Yusriana. "Perlindungan Hukum Terhadap Pengetahuan Tradisional Sebagai Hak Kekayaan Intelektual." *Juripol* 5 (20 Agustus 2022): 160–69. <https://doi.org/10.33395/juripol.v5i2.11707>.
- Rahmawati, Fanni. "Pilar-Pilar Yang Mempengaruhi Perkembangan Ekonomi Kreatif Di Indonesia." *Economic Education and Entrepreneurship Journal* 4 (21 November 2021): 159–64. <https://doi.org/10.23960/E3J/v4i2.159-164>.
- Rajendra, Josephine Bhavani, dan Ambikai S. Thuraisingam. "The deployment of artificial intelligence in alternative dispute resolution: the AI augmented arbitrator." *Information & Communications Technology Law* 31, no. 2 (4 Mei 2022): 176–93. <https://doi.org/10.1080/13600834.2021.1998955>.
- Ramli, Tasya, dan Sherly Putri. "TINJAUAN HUKUM PERBEDAAN PENGALIHAN HAK PATEN DENGAN PERJANJIAN LISENSI PADA HUKUM PERDATA." *Dialogia Iuridica: Jurnal Hukum Bisnis dan Investasi* 10 (30 November 2018): 96–100. <https://doi.org/10.28932/di.v10i1.1012>.
- ratnasari, desi. *PERSYARATAN PENDAFTARAN HAK PATEN UNTUK APLIKASI*, 2018. <https://doi.org/10.31219/osf.io/z3t4m>.
- Ribowo, Mochammad, dan Kholis Raisah. "PERLINDUNGAN HUKUM TERHADAP PATEN SEDERHANA DALAM SISTEM HUKUM PATEN DI INDONESIA (STUDI KOMPARASI DENGAN SISTEM HUKUM PATEN DI NEGARA CHINA)." *NOTARIUS* 12 (11 Juni 2019): 42. <https://doi.org/10.14710/nts.v12i1.23761>.
- Roisah, Kholis. "KEBIJAKAN HUKUM 'TRANSFERABILITY' TERHADAP PERLINDUNGAN HAK KEKAYAAN INTELEKTUAL DI INDONESIA." *LAW REFORM* 11 (30 September 2015): 241. <https://doi.org/10.14710/lr.v11i2.15772>.
- Saidin, O.K. *Aspek Hukum Hak Kekayaan Intelektual (Intellectual Property Rights)*. Jakarta: Rajawali Pers, 2010.
- Sanib, Safril. "Ketentuan-ketentuan TRIPS-Plus dalam Kerangka Perjanjian Perdagangan Bebas." *Halu Oleo Law Review* 3 (28 Maret 2019): 50. <https://doi.org/10.33561/holrev.v3i1.6016>.
- Sardjono, Agus. *Membumikan HKI di Indonesia*. Bandung: Nuansa Aulia, 2009.
- Sarif, Asri, dan I Gede Winatha. "Regulation of Patent Protection of Computer Programs as Inventions in Indonesia | 122 Regulation of Patent Protection of Computer Programs as Inventions in Indonesia." *Indonesia Law Reform Journal* 3 (3 Juni 2023): 122–31. <https://doi.org/10.22219/ilrej.v3i1.25940>.
- Satrianah. *SYARAT-SYARAT DAN KRITERIA PENYELENGGARAAN HAK PATEN BERDASARKAN UNDANG-UNDANG*, 2018. <https://doi.org/10.31219/osf.io/8xcva>.
- Setyoningsih, Erika. "Implementasi Ratifikasi Agreement on Trade Related Aspects of Intellectual Property Right (Trips Agreement) terhadap Politik Hukum di Indonesia." *Jurnal Penegakan Hukum dan Keadilan* 2 (25 November 2021): 117–29. <https://doi.org/10.18196/jphk.v2i2.11749>.
- Simatupang, Taufik. "Hak Asasi Manusia dan Perlindungan Kekayaan Intelektual dalam Perspektif Negara Hukum." *Jurnal HAM* 12 (22 April 2021): 111.

- <https://doi.org/10.30641/ham.2021.12.111-122>.
- Sinambela, Widya. “Perlindungan Hukum Atas Hak Cipta Karya Musik Dan Lagu (Putusan Pengadilan Niaga No.02/Hak Cipta/2005/PN.Niaga/Mdn),” 8 Juli 2023.
- Stentfleben, Martin. *Copyright, Limitations and Three Step Test in International and EC Copyright Law*. Den Haag: Kluwer, 2003.
- Sudjana. “Pembatasan Perlindungan Kekayaan Intelektual (Hak Cipta) dalam Perspektif Hak Asasi Manusia.” *Jurnal HAM* 1, no. 10 (2019). <https://ejournal.balitbangham.go.id/index.php/ham/article/view/515>.
- Sulaiman, Abdullah. “Mekanisme Hukum Pengupahan Buruh Perusahaan Swasta Era Globalisasi Di Indonesia.” *Hukum Pidana dan Pembangunan Hukum* 2 (27 Agustus 2020). <https://doi.org/10.25105/hpph.v2i1.7698>.
- Sumarna, Boru. “Peluang Mahasiswa Dan Dosen Untuk Mengajukan Permohonan Hak Paten (UU No.13 Tahun 2016 Tentang Hak Paten).” *Jurnal Hukum Replik* 6 (1 Maret 2018): 121. <https://doi.org/10.31000/jhr.v6i1.1180>.
- Susanti, R. Diah Imaningrum. *Hak Cipta Kajian Filosofis Dan Historis*. Malang: Setara Press, 2017.
- Syahrial. “ASPEK HUKUM PENDAFTARAN HAK CIPTA DAN PATEN.” *Greget* 13, no. 1 (2014). <https://doi.org/10.33153/grt.v13i1.543>.
- Truby, Jon, dan Rafael Brown. “Human digital thought clones: the Holy Grail of artificial intelligence for big data.” *Information & Communications Technology Law* 30, no. 2 (4 Mei 2021): 140–68. <https://doi.org/10.1080/13600834.2020.1850174>.
- Usman, Rachmadi. *Hukum Hak atas Kekayaan Intelektual (Perlindungan dan Dimensi Hukumnya di Indonesia)*. Bandung: Alumi, 2003.
- Wahid, Aceng. “Hak Kekayaan Intelektual Pada Hasil Karya Mahasiswa Dalam Bidang Teknologi Informasi,” 26 Desember 2019.
- Winatha, I Gede, Anak Prathama, Putu Setianingtyas, dan Ni Cita. “Analisis Kepastian Hukum Pengetahuan Tradisional Dan Ekspresi Budaya Tradisional Sebagai Bagian Hak Kekayaan Intelektual.” *Jurnal Ilmiah Raad Kertha* 6 (27 Februari 2023): 34–48. <https://doi.org/10.47532/jirk.v6i1.824>.
- Yunita, Sri, Dules Pratama, Marly Silalahi, dan Talita Sembiring. “Implikasi Teknologi Era Digital Terhadap Transformasi Pendidikan Di Siderejo Hilir Kecamatan Medan Tembung Sumatera Utara.” *Jurnal Darma Agung* 31 (26 April 2023): 745. <https://doi.org/10.46930/ojsuda.v31i1.3083>.
- Zebua, Rony, Khairunnisa, I Gede Iwan Sudipa, dan Sepriano. *FENOMENA ARTIFICIAL INTELLIGENCE (AI)*, 2023.