
INTELLECTUAL PROPERTY RIGHTS IN THE ERA OF 3D PRINTING AND AI

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1. Introduction

An outline of the effects of AI and 3D printing on the IPR system is given in the introduction¹. The industry has seen revolutionary changes as a result of recent developments in 3D printing and artificial intelligence. ²By piling material on top of one another until the entire thing is formed, 3D printing is a procedure that produces three-dimensional objects. Another name for it is additive manufacturing³. Conversely, artificial intelligence can be defined in a variety of ways, but for the sake of this discussion, it can be understood as intelligent machine activity. It is quite expected that there will be widespread use and availability of the items originating from these technologies given their valuable implications and possibilities. There will be significant effects on intellectual property rights at this point⁴. There will be both the production of new products and the replication of current ones due to the growing use and accessibility of 3D printing and AI products⁵. This will make it unclear for the IP owners of these items if their rights have been violated and it will also make it unclear for aspiring inventors whether they can create a product without violating the rights of others.⁶

2. Impact of 3D Printing on Intellectual Property Rights

A three-dimensional item is produced by the process of layer-by-layer addition of material in 3D printing⁷. It is sometimes referred to as additive manufacturing, and prototyping is one of its common uses. In the past ten years, 3D printing has started to replace traditional prototyping

¹ Rebeca Ferrero Guillén, "From enemies to allies: 3D printing, IP and sustainability" (2023) 18(5) Journal of Intellectual Property Law & Practice 375.

² Jyoti Lakhoria, "Emerging Technologies and Their Implications for Intellectual Property Rights" (TechGraph, 25 July 2023).

³ TT CONSULTANTS, "The Dangers of 3D Printing: A Threat to IP Rights" (TT CONSULTANTS, 22 March 2023).

⁴ Jyoti Lakhoria, "Emerging Technologies and Their Implications for Intellectual Property Rights" (TechGraph, 25 July 2023).

⁵ Springer, '3D Printing, Intellectual Property and Innovation Policy' (Springer, 11 July 2016).

⁶ '3D printing and IP rights: some issues, any solutions?' (Paris Tech Review, 16 December 2014).

⁷ 'Future now: 3D printing moves from prototyping to production' (McKinsey, 2024).

in a variety of industries, including toys, fashion, aerospace, and automotive, with the aim of producing finished goods⁸. Manufacturers fear widespread product counterfeiting as the industry moves from prototyping to mass production⁹. This is because products are easily 3D scanned, copied, and produced without proper knowledge of how this could violate intellectual property rights. Step scanning equipment is already quite affordable and in the hands of small and medium-sized businesses. It is capable of accurately replicating an object's geometry into a computer-aided design (CAD) model¹⁰. The number of copyrighted items that are being copied will rise with the popularity of low-cost 3D scanning devices like the Structure Sensor for iPad¹¹. It is probable that as a result, patent owners will file more lawsuits than they do at the moment against infringers. An increase in litigation is probably not a good thing because they raise the risk and expense of creating new products, which can stifle innovation. The intricate legal environment surrounding 3D printing and how it impacts product intellectual property rights only serves to highlight this. A product's mass production of a duplicate has led some to believe that, because of the nature of 3D printing, things may never be developed past the prototype stage in order to prevent IP infringement.¹²

3. Influence of AI on Intellectual Property Rights

Artificial Intelligence (AI) has a significant influence on Intellectual Property (IP) rights. Here are some key points:

1. **AI and IP Intersection:** There are various ways in which AI and IP interact. Artificial intelligence (AI) has the power to transform a number of industries thanks to its capacity to produce original and lifelike material, including literature, music, and graphics. This brings up a variety of intellectual property (IP) issues, including how IP can safeguard AI models, the relationships between data input, and IP protection for AI output¹³¹⁴.

⁸ 'The 3-D Printing Revolution' (Harvard Business Review, 2015).

⁹ 'What Are the Legal Issues in 3D Printing?' (3D Insider, 2024).

¹⁰ Top 3 legal issues of 3D Printing!' (Technology's Legal Edge, 2015).

¹¹ 'Legal Aspects of 3D Printing Intellectual Property Domains' (Lexology, 2020).

¹² Legal Challenges of 3D Printing: Intellectual Property and Liability in a Tech-Driven World' (LawCrossing.com, 2024).

¹³ 'AI and IP: Theory to Policy and Back Again' (Springer, 2023).

¹⁴ 'The Intersection Between AI and IP: Conflict or Complementarity?' (Springer, 2020).

2. **AI and IP Protection:** AI is changing IP law, necessitating ethical and flexible legal frameworks. International cooperation is essential to establishing consistent standards for IP related to AI¹⁵¹⁶. The most significant benefit of AI tools is that they and the works they produce can be protected by patents or copyright, in addition to being used to streamline the search, inspection, administration, and enforcement of IP rights.^{17 18}
3. **Perils and Possibilities:** AI technologies provide IP rights both benefits and challenges. For example, counterfeiters might identify secure ports—where their goods are more likely to pass past customs authorities—by using machine learning techniques. Conversely, IP offices can leverage blockchain with AI support to secure data in registration processes.¹⁹
4. **AI inventions and the Patent System:** AI inventions pose several difficulties for the existing patent system. Market participants need to be able to fully rely on timely, transparent, and accessible standards for patent awarding in order to fully embrace the value of patents and provide better protection^{20,21}. AI has a significant and diverse impact on intellectual property rights, which calls for thoughtful analysis and flexible legal frameworks. AI has the ability to improve IP protection while also presenting new difficulties for the current IP framework. This is a quickly developing topic that calls for constant investigation and discourse among interested parties.

4. Challenges and Concerns

The advent of additive manufacturing (AM), commonly known as 3D printing (3DP), has transformed from an industrial tool into a ubiquitous technology across various sectors due to the Fourth Industrial Revolution²². With its widespread adoption, 3DP qualifies as a general-purpose technology (GPT), impacting industries such as consumer goods, healthcare, transportation, and more²³. However, the rapid development in 3DP poses challenges for patent holders, leading them to potentially focus on indirect patent infringement strategies rather than

¹⁵ The IP in AI: Can AI infringe IP rights?' (Herbert Smith Freehills, 2024).

¹⁶ 'Artificial Intelligence and Intellectual Property' (WIPO, 2024).

¹⁷ 'The IP in AI: Can IP rights protect AI systems?' (Herbert Smith Freehills, 2023).

¹⁸ 'The IP in AI: Can IP rights protect AI systems?' (Lexology, 2024).

¹⁹ 'Artificial Intelligence and IP rights: threats and opportunities' (Dentons, 2022).

²⁰ 'Assessing the Patent and Trademark Office's Inventorship Guidance for AI-Assisted Inventions' (CSIS, 2024).

²¹ 'Patents and AI inventions: Recent court rulings and broader policy questions' (Brookings, 2022).

²² Rebeca Ferrero Guillén, "From enemies to allies: 3D printing, IP and sustainability"

²³ Jyoti Lakhoria, "Emerging Technologies and Their Implications for Intellectual Property Rights"

direct lawsuits. In Europe, there's a need for harmonization and clarity regarding indirect patent infringement doctrines to navigate the legal ambiguity in the 3DP landscape. Given the global nature of the issue, European courts should monitor developments internationally, particularly in the US, which leads in 3DP technology²⁴²⁵. Moreover, stakeholders must anticipate legal and commercial challenges, especially concerning online platforms and CAD file repositories. Parallely, artificial intelligence (AI) is making significant strides across industries, including intellectual property rights (IPR). While AI enhances patent search engines, research accuracy, and categorization of inventions, it also presents challenges by providing inventors access to existing patents, potentially hindering innovation. Thus, a comprehensive examination of how digital technologies, particularly AI, impact IPR is crucial. This study should explore both the benefits and drawbacks of AI for IPR innovation and development and consider future applications of AI in the field²⁶²⁷²⁸. Hence, the convergence of 3DP and AI underscores the need for a nuanced understanding of their implications for intellectual property rights²⁹. Stakeholders must proactively address legal and commercial challenges, while policymakers and courts should strive for harmonization and clarity to effectively navigate this evolving landscape.

5. Legal Framework and Solutions

The legal framework for intellectual property rights is faced with new issues in the context of 3D printing and AI, which calls for creative solutions. Conventional legal frameworks might not sufficiently tackle problems like digital piracy, reverse engineering, and 3D printing-based physical object replication. Legislators must modify current legislation or enact new rules that adequately safeguard intellectual property in the digital era in order to address these issues. The adoption of enforcement measures to stop online infringement, the updating of patent, copyright, and trademark laws to incorporate digital designs and algorithms, and the promotion of international collaboration to harmonize legal standards across jurisdictions are some potential solutions.

²⁴ Samudra Neelam Bhuyan, "Intellectual Property Right in the Digital Age- Exploring New Frontiers"

²⁵ Zainab Al-Shunnar, "INTELLECTUAL PROPERTY RIGHTS IN THE DIGITAL AGE: CHALLENGES AND SOLUTIONS"

²⁶ Jiyoung Cho and Gyu-Pyeong Huh, "Ethical Considerations: AI and Intellectual Property Rights"

²⁷ Sam Sedgwick, "Generative AI Has an Intellectual Property Problem"

²⁸ World Intellectual Property Organization, "Artificial Intelligence and Intellectual Property - WIPO"

²⁹ Nari Lee, "Reconceptualizing the interface of copyright and design rights for 3D ..."

6. Future Trends and Recommendations

The future of intellectual property rights (IPR) is full with intriguing prospects and difficulties as 3D printing and AI come together. It is crucial to foresee new trends and create proactive plans to deal with them as these technologies progress. User-generated content, decentralized manufacturing networks, and the incorporation of AI-driven design tools into the creative process are some potential future trends. Policymakers, companies, and artists should work together to produce creative solutions that strike a balance between the interests of innovators, customers, and society at large in order to successfully navigate these trends. A culture of responsible innovation, open innovation models, incentives for cooperation and knowledge sharing, and investments in educational and training initiatives are a few possible recommendations to give stakeholders the know-how and abilities they need to prosper in the future digital economy.

7. Conclusion

The blog discusses the impact of 3D printing and artificial intelligence (AI) on intellectual property rights (IPR). It highlights revolutionary changes in industries due to these technologies, leading to concerns over patent infringement and product counterfeiting. AI's transformative power raises complex IP issues, from protecting AI-generated content to addressing challenges in the patent system. Navigating these challenges requires legislative reforms, international collaboration, and proactive strategies. Future trends like user-generated content and decentralized manufacturing networks emphasize the need for proactive planning and collaboration among stakeholders. In conclusion, addressing the intersection of 3D printing, AI, and IPR requires a balanced approach that promotes innovation while safeguarding the interests of creators and society.