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Artificial Intelligence and the Future of Trademark Regulation: A Comparative Study of the United States, the European Union, and India

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ABSTRACT

This paper examines the growing impact of Artificial Intelligence (AI) on intellectual property (IP) law, and in particular on the trademark regulatory framework, where its role is strengthening by the day. The proliferation of AI-generated brand names, logos, slogans, and marketing strategies has produced marks that are increasingly difficult to distinguish from human creations and that raise novel questions of ownership and liability. Existing trademark systems in the major jurisdictions rest on long-standing, human-centric concepts and remain unclear on how trademarks created with artificial intelligence are to be treated. This paper compares and contrasts the approaches taken in the United States, the European Union (EU), and India at the convergence of AI and trademark law. While AI offers significant potential for innovation and efficiency in branding and trademark administration, it also exposes key doctrinal and regulatory gaps in existing legal frameworks. The EU has adopted a more proactive and regulatory approach to emerging technologies, while the United States has been more flexible and case-based; India, by contrast, is at a relatively early stage in evolving its trademark system to meet the commercial realities of AI. This paper concludes by arguing that today's trademark regimes require significant modernisation to respond to the legal and commercial challenges of AI-generated trademarking and enforcement. It also emphasises the importance of international cooperation and convergence in a more automated world, in order to create a level playing field that allows for legal certainty, accountability, and consistency.

Keywords: Artificial Intelligence and Trademark Law, AI-Generated Trademarks, Trademark Regulation, Intellectual Property Rights

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I. INTRODUCTION

In the twenty-first century, Artificial Intelligence has become one of the most transformative technologies, radically changing business models, innovation processes, and market competition. Of the several areas of IP rights affected by these technological advances, trademark law occupies a unique place because of its relationship with branding, consumer perception, and commercial identity. Trademarks have traditionally been linked to human creativity, commercial purpose, and business goodwill, and brand names, logos, and slogans have historically been created through human intellectual work and marketing positioning. In recent years, however, advances in AI technologies have made it possible to create commercially viable trademarks, logos, and promotional materials with little human involvement.¹

As AI becomes more prevalent in creating and managing trademarks, several intricate legal issues put existing trademark principles to the test. Current legal frameworks continue to rest on human agency, accountability, and ownership. Uncertainty remains, however, over who owns trademarks created with AI technology, who is liable when infringement occurs, and whether traditional notions of distinctiveness and use in commerce apply. Against this background, this paper compares and contrasts the legal strategies of the United States, the European Union, and India for addressing the implications of the intersection of AI and trademark law. AI presents great potential for efficiency, automation, and innovation, but it also exposes numerous shortcomings in the current trademark system. This paper calls for modern trademark law to be updated to adjust to technological developments while maintaining the basic principles of trademark law, namely consumer protection, commercial certainty, and fair competition.

II. UNDERSTANDING AI IN THE TRADEMARK ECOSYSTEM

AI is playing an increasingly important role in today's trademark landscape. AI tools now assist businesses across industries with brand development, trademark search, market analysis, and trademark enforcement.² Machine-learning algorithms can sift through vast quantities of information, including past trademarks, language, consumer behaviour, and market trends, to produce commercially viable and strategically sound branding solutions.

By incorporating AI into the branding process, companies have significantly changed conventional branding methods. Businesses can reduce costs and boost efficiency by generating

¹WORLD INTELL. PROP. ORG., WIPO TECHNOLOGY TRENDS 2019: ARTIFICIAL INTELLIGENCE (2019).

²Dev Gangjee, *Trademark Law and the Social Construction of Trust*, 1 INTELL. PROP. Q. 67 (2011).

names, logos, and slogans at an unparalleled rate and scale through AI systems. AI has also become a vital part of trademark clearance search and risk assessment: advanced algorithms can quickly search the trademark database to identify potential conflicts and minimise the risk of trademark infringement disputes.³

AI is also increasingly important in trademark enforcement and monitoring. AI-powered solutions are becoming a key tool for businesses and trademark offices to detect unauthorised trademark use on e-commerce platforms, digital marketplaces, and social-media networks.⁴ These technologies help to identify counterfeit products more quickly and to detect trademark dilution and fraudulent business practices. As AI becomes more widespread in trademark administration, however, considerable legal uncertainties arise. Under present legal frameworks, AI systems do not have legal personality, unlike natural persons or corporate entities, which makes it difficult to establish who owns, created, and is liable for a trademark produced with the help of AI. In the absence of statutory and judicial clarity, there are significant gaps in current trademark law. The central issue is whether trademarks created by AI remain solely the property of a human author, or whether AI-assisted intellectual creation should be treated as a category of intellectual property that calls for specific rules and regulations.

III. KEY LEGAL ISSUES RAISED BY AI IN TRADEMARK LAW

A. Ownership and Authorship

Human ownership and commercial control of a trademark have been a fundamental basis of trademark law. The creation of trademarks by AI challenges this conventional understanding by producing marks with very little or no human effort, raising a basic legal question of ownership. There are several alternatives. Ownership might, in theory, vest in the developer of the AI system, in the user who employs the system, or in the company that has acquired the system to use the trademark.⁵ Current trademark laws offer very little guidance on this question from one jurisdiction to another. Businesses are becoming increasingly reliant on AI-driven branding strategies, but in the absence of clear ownership principles there is legal uncertainty. Where several parties are involved in creating AI-generated branding materials, for example, it may be very difficult to establish ownership rights in the trademark. At present, trademark laws in India, the United States, and the EU contain no specific provisions on ownership standards for AI

³U.S. PAT. & TRADEMARK OFF., PUBLIC VIEWS ON ARTIFICIAL INTELLIGENCE AND INTELLECTUAL PROPERTY POLICY (2020).

⁴EUR. UNION INTEL. PROP. OFF., THE IMPACT OF ARTIFICIAL INTELLIGENCE ON THE INFRINGEMENT AND ENFORCEMENT OF COPYRIGHT AND DESIGNS (2022).

⁵RYAN ABBOTT, THE REASONABLE ROBOT: ARTIFICIAL INTELLIGENCE AND THE LAW 45-49 (2020).

trademarks. As a result, courts may be forced to apply older doctrines of contractual allocation, use, and goodwill.

B. Distinctiveness and Originality

Distinctiveness is one of the basic conditions for trademark protection: a trademark must distinguish the goods or services of one undertaking from those of another.⁶ While AI systems can create a vast number of trademarks, questions arise as to whether those creations meet the criteria of originality, creativity, and distinctiveness essential for protection. AI-generated marks might inadvertently resemble existing trademarks or produce overly generic or descriptive results, which raises important questions about the examination standards for AI-created branded elements. A further concern is that AI-generated trademarks may become more algorithmic than human. Critics argue that, because they are based on predictive probability, AI-generated marks may lack the imaginative strength that has been a hallmark of strong trademarks. The use of AI tools to create brand names can also saturate the market with generic or clichéd trademarks, potentially reducing the overall distinctiveness of trademark ecosystems. Legal frameworks may therefore need to reconsider conventional trademark examination practices and craft specific rules for examining AI-generated trademarks. Such changes might involve required disclosure of AI-generated content, more robust measures for identifying plagiarism, or stricter guidelines on originality and consumer perception in AI-driven branding.

C. Infringement Liability

Trademark cases involving AI-assisted creation further complicate the determination of liability for infringement. Where an AI-generated trademark is identical or similar to an existing trademark, it can be difficult to ascertain who is responsible: the developer of the AI system, the commercial user of the system, or the platform hosting the technology may all potentially be liable. The current trademark system is not sufficiently equipped to assign liability in such circumstances, and the absence of a clear liability regime can create major obstacles in enforcement and compliance for courts, regulators, and businesses. Moreover, AI-facilitated infringement can occur on a scale and at a pace not previously seen. Unlike human branding, an AI system can generate thousands of trademark variations in minutes, which can increase the risk of inadvertent infringement and burden trademark offices, courts, and enforcers with an enormous workload. To address these concerns, legal scholars have called for specific liability regimes for AI-facilitated IP disputes. Such measures might include mandatory human-

⁶The Trade Marks Act, 1999, No. 47, Acts of Parliament, 1999, § 9 (India).

oversight protocols, more explicit responsibilities for AI users and developers, new obligations of algorithmic transparency, or stricter pre-commercialisation due-diligence requirements for AI-created trademarks.

D. Use in Commerce

The rights in a trademark are tied to its commercial use. But the meaning of “use in commerce” becomes more elusive in relation to AI-generated trademarks and automated commercial systems.⁷ Traditional concepts of trademark use emerged in a world of human-driven business. As AI increasingly becomes part of advertising, branding, and digital commerce, current laws may need to be reinterpreted or amended to keep pace with the technologically automated nature of these activities. A further major issue is evidentiary. In trademark cases, businesses must demonstrate actual commercial use of a mark through advertising, invoices, packaging, or sales records; as AI systems acquire greater autonomy in creating and filing trademarks for online platforms, it may become harder to provide proof of use. Legislatures and courts must therefore continue to refine the definition of “use in commerce” to cover technologically enabled branding while maintaining consumer protection, market transparency, and the integrity of trademarks in the digital economy.

IV. TRADEMARK REGULATION IN THE UNITED STATES

The principal piece of legislation regulating trademark law in the United States is the Lanham Act.⁸ While the Act does not specifically address AI-generated trademarks, it continues to depend on the concepts of ownership, commercial use, and legal responsibility. The United States Patent and Trademark Office (USPTO) does not treat AI systems as legal entities and accordingly does not permit them to be trademark owners; ownership remains with natural persons or legally recognised business entities.⁹ The United States takes a relatively flexible, case-by-case approach, leaving trademark principles open to judicial interpretation as technology advances. This flexibility allows the law to evolve gradually to accommodate AI innovation, but the absence of specific statutory guidance also leaves room for legal uncertainty about the treatment of AI-generated trademarks. In other IP cases, the courts have tended to focus on human control, accountability, and intent.¹⁰ As a result, the potential use of AI as a legal creator is seen mainly as a technological aid to human commercial activity rather than as a legal entity in its own right. At the same time, the USPTO has begun to incorporate AI into

⁷Lanham Act § 45, 15 U.S.C. § 1127.

⁸Lanham Act, 15 U.S.C. §§ 1051-1141n.

⁹U.S. PAT. & TRADEMARK OFF., TRADEMARK MANUAL OF EXAMINING PROCEDURE § 803 (2024).

¹⁰*Naruto v. Slater*, 888 F.3d 418 (9th Cir. 2018).

trademark examination and administrative procedures to enhance the efficiency, accuracy, and uniformity of registration. Significant ambiguity nonetheless surrounds the questions of ownership, liability, and authorship of an AI-generated trademark.

V. TRADEMARK REGULATION IN THE EUROPEAN UNION

The EU has taken a more proactive and regulatory stance in the governance of AI. The European Union Trade Mark Regulation (EUTMR) provides the main framework for trademark protection in the EU, administered by the European Union Intellectual Property Office (EUIPO).¹¹ While the EU trademark system is not technology-specific, it rests on a principle of technological neutrality that allows it to adapt to new technologies without continuous legislative amendment. Clarity, precision, and distinctiveness are of great importance in trademark representation within the EU, so that trademarks created with AI systems must meet the same requirements as those traditionally created before they can be registered and protected. The EU has also shown foresight in measures such as the Artificial Intelligence Act, which establishes a broad regulatory framework for AI technologies across member states.¹² These measures reflect an increasing institutional awareness of the legal and ethical dimensions of AI-driven innovation. Several issues nonetheless remain unresolved. Harmonised implementation of AI regulation is likely to be complicated by variation among member states, and the ownership, accountability, and infringement liability of AI-created trademarks are not yet fully settled. Even so, the EU appears institutionally better equipped than many jurisdictions to address these issues.

VI. TRADEMARK REGULATION IN INDIA

Indian trademark law is governed by the Trade Marks Act, 1999.¹³ Like other jurisdictions, it does not explicitly refer to AI-generated trademarks or AI-assisted commercial branding. The Indian trademark system still rests on a traditional, human-centric jurisprudence based on ownership, authorship, and commercial exploitation by natural persons or legal entities. At present, only applicants who are individuals or legal entities can be identified by the Controller General of Patents, Designs and Trade Marks, so AI systems cannot own or register trademarks

¹¹Regulation 2017/1001, of the European Parliament and of the Council of 14 June 2017 on the European Union Trade Mark, 2017 O.J. (L 154) 1.

¹²Regulation 2024/1689, of the European Parliament and of the Council of 13 June 2024 Laying Down Harmonised Rules on Artificial Intelligence (Artificial Intelligence Act), 2024 O.J. (L 1689) (originally proposed as COM (2021) 206 final).

¹³The Trade Marks Act, 1999, No. 47, Acts of Parliament, 1999 (India).

under the existing legal framework. This reflects the overall thrust of Indian IP law, which centres on human agency and responsibility.

The use of AI in relation to IP in India remains relatively underdeveloped in both the judicial and the legislative spheres. Despite India's significant strides in digital governance and the regulation of technology, the trademark regime has not adequately evolved to address the challenges posed by AI-enabled branding and automated trademark creation. This legal ambiguity leaves businesses, especially those increasingly using AI-powered branding tools and marketing technologies, in a position of uncertainty, and it highlights the need for urgent legislative and regulatory change to meet the challenges of the AI era of commerce in India.

VII. COMPARATIVE ANALYSIS

Although the United States, the European Union, and India employ broadly similar conceptual starting points in regulating AI-created trademarks, they have adopted markedly different measures. A common theme across all three jurisdictions is reliance on traditional, human-centric notions of trademark ownership and authorship. No jurisdiction currently views AI systems as autonomous creators capable of holding intellectual property rights; existing systems continue to treat AI as a technological aid rather than a legal entity. Their regulatory strategies, however, diverge considerably. The United States depends heavily on judicial interpretation and the flexibility of its case-law framework to adapt to new technologies, which offers interpretative flexibility but also creates uncertainty in the absence of explicit statutory guidance. The EU, in contrast, takes a more systematic and forward-thinking regulatory approach, and the expansion of its AI-governance programmes reflects a broader preparedness to address new technological challenges. India's position is comparatively conservative and underdeveloped in this respect: although the country has made progress in digital governance, its trademark regime has not yet developed sufficiently to meet the legal challenges of AI-generated trademarks. Overall, the comparative analysis indicates that the EU is best prepared in regulatory terms and the United States most flexible in judicial terms, while the Indian trademark regime remains in need of modernisation to keep pace with rapid technological change.

VIII. THE FUTURE OF TRADEMARK REGULATION IN THE AGE OF AI

As AI technologies continue to develop and become commercialised, trademark law must continue to adapt structurally to the changing legal landscape. New trademark systems may need to acknowledge expressly the creative processes that involve AI and to define ownership,

liability, and commercial accountability, since legal concepts based solely on human creativity may be ineffective in handling the complexities of AI-powered branding.

Digital commerce is also a global phenomenon, which emphasises the need for international uniformity in trademark law. Divergent national strategies on the creation of trademarks with AI could present substantial compliance difficulties for multinational companies operating across jurisdictions. Recognising that discussions about the relationship between AI technologies and IP rights are only beginning, international organisations, including the World Intellectual Property Organization (WIPO), are already engaging with the issue. These discussions underline the transformative role of AI in global legal frameworks and reflect a growing international recognition of its influence.

Unless steps are taken to change the relevant laws and regulations in time, current trademark systems may fall short of effectively governing innovation in an increasingly automated commercial context. The future of trademark law will therefore depend on its ability to strike the right balance between innovation and the fundamental goals of consumer protection, commercial certainty, and fair competition.

IX. RECOMMENDATIONS

Specific reforms in policy and regulation are needed to address the growing legal challenges surrounding AI-assisted trademark creation. First, trademark law should include specific provisions dealing with the legal implications of AI-assisted trademark creation; clear statutory guidelines on ownership, authorship, and accountability would significantly reduce legal uncertainty. Second, laws should establish a clear liability framework capable of holding both the users and commercial entities deploying AI and the developers of AI systems responsible in cases of trademark infringement or misuse. Third, IP offices should continue to embed AI capabilities in their trademark examination, monitoring, and enforcement processes in a transparent, fair, and accountable manner. Finally, international cooperation remains essential: the harmonisation of international standards would have a substantial impact on legal certainty, international trade, and trademark enforcement, particularly in the cross-border dimension that is intrinsic to electronic commerce and the protection of IP rights.

X. CONCLUSION

AI is fundamentally challenging the traditional principles of trademark law, including the notions of ownership, authorship, liability, and commercial identity. Its ability to create trademarks without human input raises major concerns about the efficacy of intellectual property laws that were crafted to address human creativity and agency. The comparative

analysis reveals differences in the preparedness of the United States, the European Union, and India in this area: there is interpretative flexibility in the United States through judicial adaptation, and comparatively greater foresight and institutional readiness in the European Union, while India remains at a nascent stage in adapting its trademark regime to AI-driven innovation. Despite these differences, none of the jurisdictions studied currently has a comprehensive framework to address the broader issues of trademarking and enforcing AI-generated trademarks. Significant legislative modernisation and international cooperation are therefore required to adapt trademark law to the digital age and to keep it relevant, predictable, and effective. As trademark law continues to develop, its future will depend on how well legal systems can keep pace with rapid technological change while maintaining the ultimate goal of protecting intellectual property.
