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APPLICATION OF ARTIFICIAL INTELLIGENCE IN TRADEMARK EXAMINATION PROCESS IN INDIA: STUDY OF REGULATORY CHALLENGES AND OPPORTUNITIES

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ABSTRACT

The examination of trademark applications (TMA) is crucial for safeguarding trademarks, yet the Trademark Registry (TMR) encounters issues such as insufficient staff or officers, leading to delays and worries regarding accuracy, efficiency and fairness. This research examines how Artificial Intelligence (AI) may enhance the trademark examination process by accelerating registration, minimizing delays, and maintaining uniformity. AI can likewise assist in quickly locating similar or identical trademarks and identifying unauthorized usage on the internet. Nonetheless, there are legal and ethical concerns, including who is accountable for AI mistakes and if existing laws can address AI's impact on trademark law. The study will concentrate on how AI can enhance trademark examination and what legal obstacles emerge with its implementation. It will additionally assess if existing Trademark laws are adequate for AI. The research will adopt a qualitative methodology, incorporating legal documents, case studies, and discussions with trademark specialists. The central questions being explored are: In what ways can AI enhance the trademark assessment process? What legal and ethical issues arise with the use of AI in trademark law? The research seeks to assess AI's contribution to enhancing the efficiency of trademark examination and pinpoint deficiencies in existing IP regulations. The study will contribute to debates regarding AI in Trademark law especially in AI and propose methods for ensuring its legal and ethical application. AI can enhance the trademark examination process, but legal systems must evolve to address the ethical and accountability issues posed by AI.

Keywords: Intellectual Property, Artificial Intelligence, Trademark Examination, Trademark Law, efficiency, accuracy

[1] Legal (YP), CGWA, GoI, Ministry of Jal Shakti, CGWA

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Introduction

Trademark law plays a pivotal role in safeguarding the uniqueness and goodwill of businesses, with trademarks connecting directly to consumer emotions and market behavior.[3] In India, the Trademark Registry (TMR), governed by the Trade Marks Act, 1999, struggles with challenges such as increasing pendency, limited manpower, and issues of bias and inefficiency in the examination of trademark applications.[4] While artificial intelligence (AI) holds immense potential to revolutionize trademark examination by enhancing accuracy, speed, and consistency, its adoption in India remains limited. Despite judicial endorsements of AI's utility in official tasks, no legislative or judicial precedent mandates or systematically facilitates AI integration within India's TMR operations. Countries like Australia and members of the European Union have already implemented AI-driven tools such as TMICS and TMPI in IP Australia, and semantic AI analysis in EU databases streamlining trademark processes through real-time, algorithmic examination.[5]

AI can efficiently detect identical or phonetically/semantically similar trademarks and assist in monitoring unauthorized use online, thereby improving brand protection. However, its use raises critical legal and ethical concerns, such as liability for errors, absence of regulatory mechanisms, and the need for robust standard operating procedures (SOPs) to manage AI-generated decisions. A comparative analysis reveals that while global IP regimes are adapting and reforming their

[3] Controller General of Patents, Designs and Trade Marks, *Annual Report 2022–23*, IP INDIA (2023), https://ipindia.gov.in/writereaddata/Portal/Images/pdf/AnnualReport2022-23.pdf (last visited May 2, 2025).
[4] European Union Intellectual Property Office (EUIPO), *AI and Machine Learning in Trademark Examination*, EUIPO (2022), https://euipo.europa.eu/ohimportal/en/web/observatory/ai-and-machine-learning (last visited May 20, 2025).
[5] IP Australia, *Trade Mark International Classification Service (TMICS)*, IP AUSTRALIA (2023), https://www.ipaustralia.gov.au/about-us/publications/trade-mark-international-classification-service-tmics (last visited May 19, 2025).

laws to integrate AI into trademark systems, India lacks a comprehensive legislative framework addressing the role of AI in trademark law.[6]

Literature from scholars such as Abbe Brown[7], Deborah Bouchoux[8], and Lionel Bently[9] has explored the transformative role of AI in IP, but there is a significant research gap in the specific application of AI to trademark examination in Indian public offices.

The objectives of this study are to assess AI's role in the Indian trademark system, evaluate legal and ethical implications, and examine global best practices to recommend necessary reforms. Central questions include the extent of AI's role in trademark creation, examination, and enforcement; the legal safeguards necessary to ensure fairness and accountability; and how India can align its regulatory and institutional frameworks with international standards to embrace AI in the TMR process effectively.

Research Methodology

The research methodology employed to examine the impact of Artificial Intelligence on the creation, registration, and protection of trademarks, AI-assisted trademark examination at the Trademark Registry of India (TMR), associated legal and ethical challenges, and comparative analysis at both international and national levels is a mixed-method approach, incorporating both doctrinal and empirical techniques. This study utilizes qualitative and quantitative research methods, ensuring that the analysis is comprehensive, verifiable, and replicable, with a well-defined validity framework. The research applies both inductive and deductive reasoning to explore and interpret the subject matter. Data and information have been primarily collected through doctrinal research, involving a thorough review and synthesis of relevant literature to highlight key concepts, principles, and emerging trends.

[6] World Intellectual Property Organization (WIPO), *Artificial Intelligence and Intellectual Property Policy*, WIPO REPORT (2021), https://www.wipo.int/publications/en/details.jsp?id=4554 (last visited May 21, 2025); see also Indian Intellectual Property Office, *Consultation Paper on AI in IP Administration* (2023) (unpublished).
[7] Abbe E. Brown, *Artificial Intelligence and Intellectual Property*, 101 J. Intell. Prop. L. 137, 155–60 (2020).
[8] Deborah E. Bouchoux, *Intellectual Property: The Law of Trademarks, Copyrights, Patents, and Trade Secrets* 410–12 (5th ed. Cengage Learning 2018).
[9] Lionel Bently & Brad Sherman, *Intellectual Property Law* 233–35 (5th ed. Oxford Univ. Press 2014).

Hypothesis

AI based system in trademark examination reduces human bias, pendency, leading to more consistent and fair outcomes on trademark registration decisions.

I. The role and impact of Artificial Intelligence on trademark creation, registration, and protection under Indian Trademark Law-

Artificial Intelligence (AI) is increasingly transforming the landscape of Trademark Law in India by streamlining the processes of creation, registration, and protection of trademarks. In the phase of the creation, AI tools assist businesses in generating unique logos, slogans, and brand names by analyzing existing trademarks and ensuring originality, thus reducing the risk of infringement. During the registration process, AI can significantly improve efficiency by automating the examination of trademark applications, identifying phonetically or visually similar marks, and minimizing human error and bias. Given the rising pendency at the Indian Trademark Registry due to limited manpower, AI offers a scalable solution to expedite the scrutiny of applications and ensure consistency in decisions. In the protection phase, AI can be used to monitor unauthorized use of trademarks online through advanced web crawlers and machine learning algorithms, allowing businesses to take swift legal action against potential infringements. While India has made limited progress in integrating AI into its intellectual property regime, international examples such as Australia's TMICS and the EU's semantic comparison tools highlight the transformative potential of AI. To fully realize these benefits, India must amend its legal framework, establish regulatory guidelines, and address concerns regarding accountability and data protection in AI-assisted trademark processes.[10]

II. Relevant Case Laws Analysis

[10] Controller General of Patents, Designs and Trade Marks, *Annual Report 2022–23* (Gov't of India 2023), https://ipindia.gov.in/writereaddata/Portal/Images/pdf/AnnualReport2022-23.pdf (last visited May 23, 2025).

In the Indian context, several landmark cases shape the understanding of trademark examination, offering critical insights for integrating AI. In *Tata Sons Ltd. v. Manoj Dodia & Ors.* (2011)[11], the Delhi High Court emphasized the significance of phonetic similarity, highlighting the need for AI systems to accurately assess sound-based confusion. The Supreme Court in *Cadila Healthcare Ltd. v. Cadila Pharmaceuticals Ltd.* (AIR 2001 SC 1952)[12] laid down key principles regarding deceptive similarity and public confusion, forming a foundational benchmark for AI algorithms assessing likelihood of confusion. Further, *ITC Ltd. v. Nestle India Ltd.* (2021 SCC OnLine Del 2202)[13] underlined the importance of evaluating the "overall impression" of marks, supporting the development of AI systems capable of holistic visual and conceptual analysis. Internationally, *Thaler v. Comptroller-General of Patents* (UK, 2021)[14] addressed the recognition of AI as a creator, raising foundational questions about the legal identity and accountability of AI in IP decisions. In *INTERFLORA INC v. Marks and Spencer plc* (CJEU Case C-323/09)[15], the court analyzed trademark use in keyword advertising, informing AI applications in automated digital trademark contexts. Lastly, *Christian Louboutin v. Amazon* (CJEU Case C-148/21, 2022)[16] discussed platform liability for automated listings, underscoring the need for AI to effectively monitor and regulate infringing marks in digital marketplaces. Collectively, these cases highlight the legal challenges and considerations critical to responsibly deploying AI in trademark examination processes.

II. AI tools aid the examination process of trademark applications-

Artificial Intelligence (AI) tools have begun to reshape the examination process of trademark applications in India by offering promising improvements in efficiency, accuracy, and consistency, though this transformation is still at an early stage and accompanied by significant

[11] Tata Sons Ltd. v. Manoj Dodia & Ors., 2011 SCC OnLine Del 3822
[12] Cadila Healthcare Ltd. v. Cadila Pharmaceuticals Ltd., AIR 2001 SC 1952.
[13]ITC Ltd. v. Nestle India Ltd., 2021 SCC OnLine Del 2202.
[14] Thaler v. Comptroller-General of Patents, [2021] EWHC 2412 (Pat) (UK).
[15] Interflora Inc. v. Marks & Spencer plc, Case C-323/09, 2011 E.C.R. I-0000 (CJEU).
[16] Christian Louboutin SAS v. Amazon EU Sàrl, Case C-148/21, 2022 E.C.R. I-0000 (CJEU).

challenges.[17] The trademark examination process traditionally involves manual scrutiny by human examiners who analyze the distinctiveness of marks, search for conflicts with existing trademarks, and assess compliance with legal requirements as stipulated under the Trade Marks Act, 1999. However, the Indian Trademark Registry (TMR) faces growing pendency and backlog due to a limited number of examiners and increasing application volumes, which impairs timely processing and increases the risk of errors or inconsistent decisions. AI tools can address these issues by automating key aspects of trademark examination. Through advanced machine learning algorithms and natural language processing, AI systems can rapidly scan vast trademark databases to identify identical, phonetically similar, or semantically related marks, which would otherwise require extensive time and effort from human examiners. This capability not only speeds up the search and examination phase but also reduces the likelihood of overlooking potential conflicts, thereby enhancing the quality and reliability of decisions. Furthermore, AI can assist in classifying goods and services accurately according to the Nice Classification[18] system, streamlining the categorization process and minimizing human error. AI-based image recognition technologies also hold promise for analyzing logos and device marks for similarity and distinctiveness. Despite these clear benefits, the deployment of AI in the Indian trademark examination process presents complex legal, technical, and ethical challenges. One key concern is the risk of over-reliance on AI-generated outputs without sufficient human intervention, which could result in unjust rejections or approvals if the AI model misinterprets data or lacks contextual understanding. The so-called "black box" nature of many AI algorithms undermines transparency, making it difficult for applicants to challenge decisions based on AI assessments or to understand the rationale behind refusals. This opacity may also conflict with principles of natural justice and procedural fairness enshrined in Indian law. Additionally, the effectiveness of AI tools heavily depends on the availability of comprehensive, high-quality, and updated data, which is currently fragmented across various registries and jurisdictions in India, limiting AI's

[17] Ministry of Electronics and Information Technology, *National Strategy on Artificial Intelligence* (NITI Aayog 2018), https://niti.gov.in/writereaddata/files/document_publication/NationalStrategy-for-AI-Discussion-Paper.pdf (last visited May 23, 2025).
[18] International (Nice) Classification of Goods and Services for the Purposes of the Registration of Marks (Nice Classification), 11th ed. (2023), WIPO, https://www.wipo.int/classifications/nice/en/ (last visited May 27, 2025).

ability to deliver consistent outcomes. Another significant issue concerns liability and accountability: if an AI system errs in the examination process such as wrongly rejecting a valid trademark application or failing to detect infringement there is ambiguity over who bears responsibility, whether it is the human examiner, the Registry, or the developers of the AI system.[19] Furthermore, privacy and data protection concerns arise when AI tools process vast amounts of proprietary and personal data from trademark applications. Currently, Indian IP laws and regulations do not explicitly address the use of AI in trademark examination, resulting in a regulatory vacuum that complicates the legal validity and enforceability of AI-assisted decisions. Although international jurisdictions like the European Union and Australia have begun integrating AI into their trademark offices with clearer legal frameworks, India has yet to enact specific rules or standard operating procedures governing AI in its trademark processes. Therefore, while AI offers substantial opportunities to improve trademark examination in India by expediting searches, enhancing accuracy, and reducing examiner workload, its integration must be approached cautiously. A balanced framework that combines AI's technical strengths with human expertise is essential to ensure transparency, accountability, and fairness. Legal reforms are needed to clarify liability, establish data standards, and protect applicants' rights. Continuous monitoring and evaluation of AI tools' performance will be crucial to identify biases and errors. Ultimately, the responsible adoption of AI in India's trademark examination can modernize the system and align it with global best practices, provided that technological innovation is harmonized with sound legal and ethical governance.[20]

III. Legal and ethical challenges arising from the use of AI in trademark examination at India's Trademark Registry-

The integration of Artificial Intelligence (AI) into trademark examination at India's Trademark Registry brings significant legal and ethical challenges that require scrutiny. Legally, one of the foremost concerns is accountability. If an AI system errs in evaluating trademark applications, it

[19] Information Technology (Reasonable Security Practices and Procedures and Sensitive Personal Data or Information) Rules, 2011**,** Ministry of Electronics & Information Technology, India (2011).
[20] Cary Coglianese, *Accountability and Transparency in Artificial Intelligence*, 3 **Regul. AI & Ethics** 35 (2019).

remains unclear who bears responsibility, whether it is the human examiner, the Registry, or the AI developers. This ambiguity complicates the enforcement of decisions and remedies available to aggrieved applicants. Moreover, current Indian intellectual property laws lack explicit provisions governing AI's role in examination, creating a regulatory gap that undermines the legitimacy and transparency of AI-assisted outcomes. Ethical issues also arise around fairness and bias; AI algorithms trained on incomplete or skewed data sets may perpetuate existing prejudices or make inconsistent decisions, disproportionately affecting certain applicants or trademark categories.[21] The opaque nature of many AI systems the so called "black box" problem further impedes transparency, limiting applicants' ability to understand or challenge adverse decisions based on AI analysis, which conflicts with principles of natural justice. Additionally, privacy concerns emerge from the processing of sensitive proprietary information during AI-driven examinations. Balancing innovation with these challenges demands the development of clear legal frameworks, robust oversight mechanisms, and human-in-the-loop models to ensure that AI enhances trademark examination without compromising fairness, accountability, and applicants' rights in India's evolving IP landscape.[22]

IV. Global advancements in the use of AI tools have driven significant reforms in Trademark Registry-

Globally, the integration of Artificial Intelligence (AI) tools into Trademark Registry Management (TMR) has led to significant regulatory and procedural changes aimed at enhancing efficiency, accuracy, and consistency in trademark examinations. Many countries, especially in developed regions like the European Union, Australia, and Japan, have proactively adapted their intellectual property frameworks to incorporate AI-driven technologies. These changes include the adoption of AI-powered search and classification systems that expedite the detection of identical or similar trademarks, reduce human error, and manage large volumes of applications

[21] Finale Doshi-Velez & Been Kim, *Towards a Rigorous Science of Interpretable Machine Learning*, arXiv:1702.08608 [cs.LG] (2017), https://arxiv.org/abs/1702.08608 (last visited May 27, 2025).
[22] Christoph Lütge, *Ethics of Artificial Intelligence and Robotics*, in Edward N. Zalta (ed.), *The Stanford Encyclopedia of Philosophy* (Summer 2020 Edition), https://plato.stanford.edu/entries/ethics-ai/ (last visited May 27, 2025).

with greater speed. For instance, IP Australia's implementation of the Trademark International Classification Service (TMICS) and Trademark Precedent Identification (TMPI) tools exemplify how AI assists examiners in comprehensive and precise assessments. Similarly, the European Union has developed data-driven platforms that use machine learning and semantic analysis to improve trademark searches and monitor infringements more effectively. These reforms often come with updated guidelines and protocols addressing the transparency, accountability, and ethical use of AI in trademark processes. However, challenges remain globally regarding the standardization of AI regulations and addressing liability concerns arising from AI errors. Overall, these international developments reflect a growing recognition of AI's transformative potential in trademark law, encouraging nations to modernize their TMR systems while balancing technological innovation with legal safeguards and fairness.[23]

Global Practices: Application of AI in Trademark Offices Worldwide- Across the globe, Intellectual Property (IP) offices are increasingly leveraging Artificial Intelligence (AI) to streamline trademark examination processes, improve efficiency, and enhance consistency. The European Union Intellectual Property Office (EUIPO) has implemented AI tools such as the AI Image Search Tool and TM class for automated classification, resulting in over 25 million image searches by 2023 and a 40% reduction in classification errors. According to EUIPO's AI Roadmap, the office aims to automate 80% of repetitive tasks by 2025. In the United States, the USPTO uses an AI-powered similarity search tool and the Madison AI Project to reduce examiner search time by 15–20% and has reported a 10% increase in consistency of office actions.[24] The World Intellectual Property Organization (WIPO) offers an AI-driven image search tool that accesses over 40 million trademark records, and its WIPO Translate tool supports multilingual document processing.[25] China's CNIPA has integrated AI in classification and similarity checks, helping to reduce the examination period to an average of 4 months for

[23] Kate Crawford, *Atlas of AI: Power, Politics, and the Planetary Costs of Artificial Intelligence* 100–05 (Yale Univ. Press 2021).
[24] European Union Intellectual Property Office, *AI and Machine Learning in Trademark Examination* (2022), https://euipo.europa.eu/ohimportal/en/web/observatory/ai-and-machine-learning.
[25] World Intellectual Property Organization (WIPO), *Artificial Intelligence and Intellectual Property* (2021), https://www.wipo.int/about-ip/en/artificial_intelligence/.

over 7 million annual applications, with over 80% of reviews assisted by AI in 2023.[26] The Japan Patent Office (JPO), in collaboration with academic and private sectors, has developed AI tools that have cut examiner workload by approximately 25% since 2022.[27] Similarly, the Korean Intellectual Property Office (KIPO) employs a Smart Examination System and AI recommendation engines, leading to 20–30% faster trademark decisions.[28] In Singapore, the IPOS GO mobile app uses AI for trademark filing and classification, enabling more than 90% of applications to utilize automated suggestions and reducing processing time to under 4 months.[29] These global practices demonstrate how AI is transforming trademark administration by enhancing speed, accuracy, and access.

Rationale of the Study

Since the COVID-19 pandemic, the backlog of trademark applications has steadily increased, largely due to the current human-driven online examination process where examiners often have differing perspectives on the same trademark, leading to inconsistent evaluations, delays, and postponements in issuing trademark certificates. To support the vision of Viksit Bharat, it is imperative to adopt advanced technologies like Artificial Intelligence (AI) in trademark examination. Internationally, countries such as Australia, China, and the European Union have already implemented AI-driven assessment tools within their trademark registry offices, enabling precise, efficient, and real-time evaluation of trademark applications. AI can assist human examiners quickly and accurately identifying identical or well-known trademarks without ambiguity, thereby streamlining the registration process and reducing pendency. The significance of this research lies in its potential to contribute meaningfully to the Trademark Registry under the Department of CGPDTM, Government of India, by enhancing the efficiency and accuracy of trademark examinations. Adoption of AI technology can help prevent trademark infringements,

[26] China National Intellectual Property Administration (CNIPA), *Annual Report 2023* (2024), http://english.cnipa.gov.cn/news/Reports/2024.
[27] Japan Patent Office (JPO), *Annual Report on Intellectual Property* (2023), https://www.jpo.go.jp/e/resources/report/index.html.
[28] Korean Intellectual Property Office (KIPO), *Smart Examination System* (2023), https://www.kipo.go.kr/en/HtmlApp?c=41012.
[29] Intellectual Property Office of Singapore (IPOS), *IPOS GO App and AI Usage* (2023), https://www.ipos.gov.sg/resources/ipos-go.

reduce costly litigation, safeguard the quality and reputation of trademark proprietors' products, and ultimately strengthen India's position as an economic power in the global intellectual property rights (IPR) landscape.

Findings

The study reveals that Artificial Intelligence (AI) is poised to significantly transform trademark creation, registration, and protection under Indian Trademark Law by enhancing efficiency, accuracy, and consistency throughout the process. AI's ability to generate unique marks, automate complex searches for similar trademarks, and monitor infringement online can help address the growing backlog at India's Trademark Registry while improving decision quality. However, despite promising advancements globally such as Australia's TMICS and the EU's semantic tools India currently lacks a comprehensive legal and regulatory framework to govern AI's integration in trademark examination, creating challenges related to accountability, transparency, data privacy, and ethical use. The opaque "black box" nature of AI systems raises concerns about fairness and natural justice, as applicants may find it difficult to understand or contest AI-based decisions. Furthermore, liability ambiguities and fragmented data infrastructure complicate effective AI deployment. International experiences underscore the need for balanced frameworks that combine AI's technical strengths with human oversight, clear guidelines, and continuous monitoring to mitigate bias and errors. Overall, the study highlights that while AI holds substantial promise to modernize India's trademark system and boost economic growth through intellectual property protection, its successful adoption depends on thoughtful legal reforms, ethical governance, and harmonization with global best practices to safeguard applicants' rights and maintain trust in the system.

Conclusion & Suggestions

In conclusion, the integration of Artificial Intelligence into India's trademark creation, registration, and protection processes presents a transformative opportunity to enhance efficiency, accuracy, and consistency, thereby addressing longstanding challenges such as

backlog and human error.[30] However, realizing AI's full potential requires careful navigation of significant legal, ethical, and technical issues including accountability for errors, transparency in decision-making, data privacy, and bias mitigation. India's current intellectual property framework lacks explicit provisions to regulate AI's use in trademark examination, highlighting an urgent need for comprehensive legal reforms, clear regulatory guidelines, and robust oversight mechanisms. Drawing lessons from international advancements in jurisdictions like Australia and the European Union, India should adopt a balanced human-AI collaborative model that safeguards procedural fairness and natural justice while leveraging AI's analytical strengths. Suggestions for future action include enacting specific laws governing AI's role in IP administration, establishing data standards and interoperability across trademark databases, ensuring transparency through explainable AI systems, and implementing continuous monitoring to detect and rectify biases or errors. Additionally, capacity building for examiners to effectively oversee AI tools and fostering stakeholder awareness are crucial. By aligning technological innovation with ethical governance and legal clarity, India can modernize its trademark regime, strengthen intellectual property protection, and contribute to the nation's economic growth in the digital age.

[30] Seán O'Connor, *The Challenges of Integrating Artificial Intelligence in Intellectual Property Law*, 42 **EIPR** 257 (2021).

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8. Protection of Plant Varieties and Farmers Rights Act, 2001.
9. Information Technology Act, 2000.