

A STUDY ON THE EFFICACY OF AI-DRIVEN TRADEMARK IMAGE RECOGNITION IN INDIA

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Abstract

The field of Intellectual Property law has changed significantly with the introduction of Artificial Intelligence (AI), especially in the area of trademark recognition of images. The effectiveness of AI-driven trademark recognition of images in India is investigated in this study. The study looks into how AI-driven trademark image recognition is carrying out in India right now. It examines applicable case law and legislative measures as well as the Indian judicial system that oversees trademark law and image recognition. In order to detect any trademark infringements, the study assesses the accuracy as well as reliability of AI-driven trademark image recognition systems. It also looks at the possible dangers and difficulties of depending too much on AI-powered technologies. Understanding into the effectiveness of AI-driven trademark image recognition in India and its consequences for trademark law and practice are the main goals of this study.

Keywords: Artificial Intelligence (AI), Image, Recognition, Trademark, Trademark Act

1. Introduction

In the constantly changing field of Intellectual Property Rights, trademarks are essential resources for companies all over the world as they represent customer trust, brand identity, and reputation. The significance of protecting trademarks and intellectual content has been highlighted by the growth of digital platforms and the easy flow of information. Consequently, safeguarding Intellectual Property (IP) rights has grown more difficult. Artificial Intelligence (AI) presents a promising solution to these problems. The use of AI in a variety of fields, including IP protection, is becoming more apparent.

The importance of AI in protecting IP has grown in the modern world, where digitisation of business and content is the standard. In order to combat IP infringement, stakeholders are using AI technologies. AI algorithms are being used by online

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marketplaces to counteract the growing threat of unauthorised copyrighted material. Cross-border intellectual property issues have intensified as a result of the globalisation of trade, and brand owners must conduct a comprehensive search throughout local marketplaces in each nation of interest. In case of trademarks, infringement of rights is of great concern, so a thorough search is needed, which is time consuming and rigorous.

Artificial Intelligence may prove immensely beneficial in this regard to prevent infringement of rights and promote ease and access of technologies to identify trademark images.

2. Conceptual Framework

AI trademark search is becoming more and more important in contemporary IP administration, as it is transforming trademark searches and providing improved accuracy and efficiency. Current IP situation and AI's function in trademark search applications must be reviewed before a product or service may be granted an IP right. Examining the product or service is therefore essential to guaranteeing its uniqueness. Previously, people have used traditional techniques, such as the Vienna classification, to determine if the filed mark is related to any already-approved trademarks. One major intellectual property difficulty is the intricacy of trademark searches. The greatest option may be to combine AI trademark search with the knowledge of a trademark examiner.¹ To improve trademark search and inspection procedures, the United States Patent and Trademark Office (USPTO) has been investigating AI technology. The European Union Intellectual Property Office (EUIPO) has established AI tools, which use AI to locate visually related trademarks inside its database. The World Intellectual Property Organisation (WIPO) has created an AI-powered trademark picture search engine.

In light of these difficulties, applying AI technology has become a viable way to improve IP protection tactics.

2.1. AI-Powered Monitoring and Search Platforms

Redefining detection capabilities for copyright and trademark owners, AI-powered monitoring systems have revolutionised the detection capabilities in IP enforcement. These cutting-edge technologies are capable of doing automated searches

¹ S. Balasubramanian, "AI-Powered Trademark Registration Systems: Streamlining Processes and Improving Accuracy" 14(1) *International Journal of Intellectual Property Rights* 1 (2024).

and monitoring enormous volumes of internet data, including social media, websites, and online marketplaces. Additionally, they apply AI computer vision algorithms to identify logos, trademarks, and other visual components, effectively identifying instances of trademark infringement in online photos and multimedia material. Studies have confirmed how well AI-powered tools and technologies work to increase the efficacy of spotting possible violations, highlighting the critical role AI plays in raising detection accuracy. The development of enforcement strategies has been greatly impacted by the use of AI algorithms to detect violations. Since their efficacy has been widely acknowledged, AI-driven detection agents are now essential parts of anti-IP infringement tactics.

In one recent instance, a well-known e-commerce site used machine learning algorithms to accurately detect trademark infringements.² Using pre-existing datasets that include registered logos, brands, and product designs, among other identifiers, the system was taught to analyse international listings and separate photographs submitted by sellers. The system was able to identify items with comparable intellectual designs through this screening process, and when infringement was detected, the AI and ML (Machine Learning) algorithms triggered takedown requests by notifying the appropriate authorities so they could take appropriate action. The potential impact of infringements on original items and content consumption was lessened by prompt reaction measures.³

2.2. Analytics driven by AI

Empowering international enforcement strategies, AI-powered analytics facilitate the transition from surveillance to enforcement. Large databases of past IP infringements may be analysed by AI algorithms to find patterns, new risks, and possible hotspots. This data aids brand owners in creating more effective enforcement plans. Predictive analytics powered by AI provides insights into possible future trademark violation issues, which may then be utilised for risk assessment or the implementation of preventative actions. An added benefit is that these systems are cross-border and capable of analysing global information, which makes IP enforcement possible outside of a single

² Tom Crosthwaite, "Amazon Project Zero: Fight Counterfeiters with Brand Registry", *available at*: <https://blog.acadia.io/blog/amazon-project-zero-fight-counterfeiters-with-brand-registry> (last visited on October 24, 2024).

³ Anna Pokrovskaya, "The Role of AI in Protecting Intellectual Property Rights One-Commerce Marketplaces" 12(1) *Russian Law Journal* 309 (2024).

nation. Effective cross-border enforcement is made possible by the availability of global datasets and integrated AI analysis, which also helps with collaboration and navigating global legal environments.

2.3. AI and Human Expertise

In order to provide a more accurate and nuanced search process, AI systems may be built to use several similarity measures. This improves the effectiveness of trademark examinations and lowers the possibility of human mistake. As AI is increasingly used in trademark or copyright enforcement, it is crucial to remember that, although it can save time and money, it is not always flawless and that human oversight is typically required to examine and confirm the final set of results. For precise and effective decision-making in these tasks, as well as for handling complicated IP infringement cases, the proper balance between human knowledge and AI is essential.⁴

AI can lower labour and resource costs related to manual searches. AI-driven solutions can yield more thorough and accurate findings, which helps examiners and trademark owners make better decisions.

In the current era, AI has had a revolutionary effect on intellectual property enforcement tactics. Both trademark examiners and applicants can gain from the most accurate trademark search results when similarity metrics and AI are combined. AI trademark search technology will benefit trademark examiners and consumers the sooner government agencies and IP offices implement it.

Natural Language Processing (NLP) algorithms may help with search and classification procedures by extracting important information, spotting trends, and classifying trademarks according to semantic similarities. Based on a number of variables, including class specifications, legal requirements, and trademark similarity, machine learning approaches can assist in determining the likelihood of trademark acceptance or rejection.⁵ In fact, an integrated machine learning approach is crucial for auto-detection of trademark similarities, with multi featured similarity analyses. If

⁴ Khushi Rastogi, "AI-Generated Trademarks: Innovation meets Intellectual Property", *available at*: <https://www.legalserviceindia.com/legal/article-17673-ai-generated-trademarks-innovation-meets-intellectual-property.html> (last visited on October 29, 2024).

⁵ Hayfa Alshowaish, Yousef Al-Ohali, *et.al.*, "Trademark Image Similarity Detection Using Convolutional Neural Network" 12(3) *Applied Sciences* 1752 (2022).

deployed and executed at a global level, it could ensure a rapid increase in improvement of wider trademark protection, as ultimately the goal is to prevent infringement of rights and bring about access and ease in usage.⁶

2.4. Difficulties and Disadvantages

Although AI has enormous potential to transform trademark registration procedures, there are a number of issues that must be resolved when integrating it. In order for AI algorithms to assess and produce precise predictions, they need high-quality, comprehensive data. However, the performance of AI systems may be hampered by trademark databases' inconsistent, out-of-date, or missing data. AI model training may also be difficult due to restricted access to intellectual trademark data. AI systems must perform the difficult job of properly categorising trademarks and determining how similar they are. It is difficult for AI systems to produce consistent and trustworthy results due to the subjective nature of trademark evaluation and the subtleties of legal criteria. The process of trademark examination is made more difficult by linguistic variances, cultural settings, and variations in trademark descriptions. When using AI technology, there are security and privacy issues since trademark data is private and sensitive. Businesses and people are at serious danger from unauthorised access, data breaches, and abuse of trademark information. Protecting trademark data and stakeholders' privacy rights requires the implementation of strong security mechanisms, encryption methods, and access controls.

3. Legal Framework in the Indian Jurisdiction

The interplay of Indian trademark law and image recognition assisted by AI technology is in very nascent stages. AI-driven trademark image recognition is an evolving area. It is important to note that, there is no official definition for AI trademark image or image recognition and there are no exact legal provisions for them either.

3.1. Beginning in India

In the 2010s, to improve the processing speed of trademark applications, the Indian Trademark Registry started investigating technologies. Electronic filing and searching systems were part of the early implementations, although they were mostly

⁶ Charles V. Trappey, Amy J C Trappey, *et.al.* "Intelligent Trademark Similarity Analysis of Image, Spelling, And Phonetic Features Using Machine Learning Methodologies" 45 *Advanced Engineering Informatics* 4 (2020).

manual and only partially integrated AI. In the latter half of the decade, digitisation of the trademark register and increasing the effectiveness of trademark inspection were started by the Indian government. Indian start-ups started to appear, concentrating on AI-powered trademark protection and monitoring systems. The National IPR Policy, which was introduced by the Indian government in 2016, encourages the use of technology in intellectual property management. The Trade Marks (Amendment) Rules of 2017⁷ promoted the use of technology in trademark application procedure. For instance, Rule 14 allows for electronic submission of applications;⁸ Rule 115 allows hearings conducted through video-conferencing or other audio-visual mediums;⁹ communications sent by the trademarks office through email will be understood as completed service, and there is no need to serve documents through a post under Rule 18¹⁰ etc.

In India as well as outside, AI-enabled trademark identification is developing quickly. While more effective systems have been made possible by worldwide developments, India's adoption is advancing, with an emphasis on using technology to improve IP management.

3.2. The Trade Marks Act of 1999

A provision on image recognition specifically is not included in the Indian Trade Marks Act.¹¹ Therefore, let us look into the provisions that relate with AI driven trademark image recognition.

Section 2(1)(m) of the Act talks about an inclusive definition on "*mark*"¹² which consist of a "*device, brand, heading, label, ticket, name, signature, word, letter, numeral, shape of goods, packaging or combination of colours or any other combination.*"

Section 2(1)(zb) explains the meaning of "*trade mark*".¹³ It states that "*trade mark means a mark capable of being represented graphically and which is capable of*

⁷ The Trade Marks Rules, 2017.

⁸ *Id.*, r. 14.

⁹ *Id.*, r. 115.

¹⁰ *Id.*, r. 18.

¹¹ The Trade Marks Act, 1999 (Act 47 of 1999).

¹² *Id.*, s. 2(1)(m).

¹³ *Id.*, s. 2(1)(zb).

distinguishing the goods or services.” An image under trademark image is also a mark which is represented graphically.

Section 11 talks about “*relative grounds for refusal of trademark registration*”¹⁴. For example, if there is any similarity between the trademarks, the registration of the newly registered trademark will be refused.

Section 23 of the Act talks about trademark registration¹⁵ in detail.

Section 29 of the Act states that if a trademark is found identical or similar then it will be considered as infringement of registered trademarks.¹⁶

Section 30 of the Act states that Section 29 does not restrict the use of a registered trademark by others for the purpose of identifying products or services as belonging to the trademark owner, as long as the usage is legitimate.¹⁷

3.3. The Information Technology Act of 2000

The Information Technology Act of 2000 (IT Act)¹⁸ regulates AI driven image which includes digital image, electronic commerce, etc.

Section 2 talks about different types of definitions¹⁹ which explains AI driven images like the meaning of “computer”, “image”, “electronic record” etc. The definition of “information” is also given under the IT Act. Under this definition, image is also considered as information.

Section 2(w) also defines “intermediary”. It states that an intermediary is a person who helps in handling online information on behalf of others which includes search engines, online marketplaces, etc.²⁰

¹⁴ *Supra* note 11, s. 11.

¹⁵ *Id.*, s. 23.

¹⁶ *Id.*, s. 29.

¹⁷ *Id.*, s. 30.

¹⁸ The Information Technology Act, 2000 (Act 21 of 2000).

¹⁹ *Id.*, s. 2.

²⁰ *Id.*, s. 2(w).

Sections 3 and 4 of the Act talk about “*Authentication of electronic records*”²¹ and “*legal recognition of electronic records*”.²² As per the Act, AI driven image will also come under electronic record.

Section 43 of the IT Act talks about “*Penalty and compensation for damage to computer, computer system, etc.*” Sub-section b of this section²³ states that “*if someone downloads, copies or extracts any computer data from computer system will be responsible to pay for damages.*”

Section 66 talks about “*Computer related offences*”²⁴. It states that “if someone commits computer related offences, they shall be punished with imprisonment of three years or fine of Rs. Five Lakhs or both.

3.4. Trade Marks Rules, 2017

Rule 22 of Trade Marks Rules explains about the request to Registrar for search.²⁵

Rule 31 of the Rules states that if there are any deficiencies in applying for trademark registration, the Registrar will send notice to the applicant to fix the deficiencies within one month. If the issue does not get fixed, they may need to reapply.²⁶

Rule 33 of the Rules talks about examination, objection to acceptance, hearing. This rule states that a person can conduct a search on whether there is any similarity between the trademarks.²⁷

3.5. Manual of Trade Marks

Trade Marks (TM) Manual states under examination of applications filed for registration of trademarks that, the examiner should carefully look through the application and should go through the trademarks which are similar to the trademarks that are examined and should make a report through the system.²⁸

²¹ *Supra* note 18, s. 3.

²² *Id.*, s. 4.

²³ *Id.*, s. 43(b).

²⁴ *Id.*, s. 66.

²⁵ The Trade Marks Rules, 2017, r. 22.

²⁶ *Id.*, r. 31.

²⁷ *Id.*, r. 33.

²⁸ A draft of Manual of Trade Marks Practice & Procedure, 29 (Government of India, 2015).

Under the section of “*examination of application as to relative grounds for refusal of registration*”, it has been mentioned that, the examiner can search the similarity of trade marks through a system which is known as Trade Marks system (TMS). TMS includes phonetic search system, device mark system, etc. This part allows the examiners to search through device mark system to find whether there is any similarity between trademarks.²⁹

4. Developments in Foreign Jurisdictions

To understand India’s stand better, it is the need of the hour to look to other nations and organisations at global levels which have made considerable progress, and started developing the technology and adequate legal framework in this regard.

4.1. World Intellectual Property Organisation (WIPO)

Convention on WIPO has defined the term ‘Intellectual Property’ wherein it has been stated that IP also includes “*trademarks, service marks, and commercial names and designations*”.³⁰ WIPO introduced an AI-driven image search tool to simplify trademark searches. The new technology uses deep learning to find specific concepts like symbols, objects, etc. within images and not just shapes and colours. This was launched to produce more relevant results so that it will be easy to verify trademark similarities, reduce search time, cost, etc. WIPO’s former Director General, Francis Gurry mentioned that advancement in AI technology boosts trademark searches including trademark confidence and monitoring. This creation is important in the current global economy where companies need brand protection.³¹

4.2. The European Union Intellectual Property Office (EUIPO)

The European Union Intellectual Property Office (EUIPO) has incorporated AI-powered technology into its TMview search platform, enhancing its capabilities in trademark examination. This integration enables trademark image recognition, allowing the system to detect and analyse visually similar trademarks with greater accuracy and

²⁹ *Id.* at 28.

³⁰ Convention Establishing the World Intellectual Property Organization (as amended on September 28, 1979).

³¹ “WIPO Launches State-of-the-Art Artificial Intelligence-Based Image Search Tool for Brands”, available at: https://www.wipo.int/pressroom/en/articles/2019/article_0005.html (last visited on November 10, 2024).

efficiency.³² By leveraging artificial intelligence, TMview can compare trademark images, identify potential conflicts, and assist users in conducting more precise and comprehensive trademark searches. This advancement significantly improves the reliability and speed of trademark clearance processes.

4.3. The UK Patent Office

While the steps to register a trademark vary from country to country, the basic rules for getting a trademark approved are largely the same worldwide. For instance, as per the UK Patent Office, trademarks must meet specific conditions before being registered. To qualify, a trademark must be a unique symbol, word, or image that can be visually represented, stand out from commonly used terms in its industry, etc.³³

4.4. China Trademark & Patent Law Office Limited (CTPLO)

CTPLO mentioned about the benefits of AI in trademark image recognition. It stated that, the cutting-edge technology yields a more targeted and refined search of comparable trademarks, enabling businesses to navigate brand expansion into new markets with increased confidence and precision. By streamlining the search process, this innovation also reduces the workload and labour costs associated with trademark examination, benefiting trademark examiners, industry professionals, etc., and results in enhanced efficiency and cost-effectiveness.³⁴

4.5. Benelux Office for Intellectual Property (BOIP)

Benelux is the short form of three countries which are Netherlands, Belgium and Luxembourg and BOIP is an official body for trademarks. Darts-IP, an AI-driven trademark image recognition, has partnered with BOIP to enhance trademark searches. BOIP will utilise Darts-IP's advanced image recognition technology, trained on millions of trademark cases, to analyse logos and identify similar or identical marks based on design, shape, colour, and lettering. This innovative tool, developed in collaboration with

³² "Trade mark search", available at: <https://www.euipo.europa.eu/en/trade-marks/before-applying/availability> (last visited on January 29, 2025).

³³ John P. Eakins, "Trademark Image Retrieval", in: Michael S. Lew. (ed.), *Principles of Visual Information Retrieval. Advances in Pattern Recognition* 321 (Springer London Ltd., 2001).

³⁴ "Artificial Intelligence Eases Trademark Image Searches", available at: <http://ctplo.com/blog/artificial-intelligence-eases-trademark-image-searches> (last visited on November 13, 2024).

legal experts, will be integrated into BOIP's database, enabling users to efficiently search trademarks valid in the Benelux region.³⁵

4.6. The Intellectual Property Office of Singapore (IPOS)

Clarivate Analytics' CompuMark has partnered with IPOS to enhance trademark searches using AI-driven image recognition technology. IPOS's new mobile app will simplify checking proposed image trademarks for uniqueness. This collaboration reflects a growing trend among governments to leverage cutting-edge technology for innovative IP management. CompuMark's integration solution enables national IP offices to offer image search capabilities, reducing ambiguity and increasing transparency for examiners and the public.³⁶

4.7. The United States Patent and Trademark Office (USPTO)

The United States Patent and Trademark Office (USPTO) is actively exploring the potential of Artificial Intelligence (AI) to enhance and streamline its trademark search and evaluation processes. AI-driven tools have the capability to significantly improve the accuracy, efficiency, and speed of trademark searches by automating the detection of similar word marks, logos, and designs. AI-powered systems can analyse vast trademark databases more effectively than traditional methods, reducing the risk of human error and improving consistency in decision-making. These technologies leverage machine learning, Natural Language Processing (NLP), and computer vision to compare marks based on phonetic, textual, and visual similarities. By incorporating AI, the USPTO aims to make trademark examination more efficient, reliable, and accessible for applicants while also reducing backlogs and administrative burdens. This initiative aligns with broader global trends where major IP offices, including EUIPO and WIPO, are integrating AI to modernise IP management.³⁷

³⁵ "Darts-ip Image Search Technology Licensed to Benelux Office for Intellectual Property", *available at*: <https://www.boip.int/en/darts-ip#pressrelease> (last visited on Nov 13, 2024).

³⁶ The Intellectual Property Office of Singapore launches image trademark search using CompuMark technology, *available at*: https://s25.q4cdn.com/545999524/files/doc_news/2019/08/966af78c-fa69-8ea3-3c73-794596b3e290.pdf (last visited on Nov 13, 2024).

³⁷ Gopal Singh Rawat, "Navigating the Future: AI Trademark Search Revolutionizing Intellectual Property Administration", *available at*: <https://sagaciousresearch.com/blog/ai-trademark-search-revolutionizing-ip-administration/> (last visited on November 13, 2024).

5. Judicial Observations

In the case of *L'Oréal SA and Others v. eBay International AG and Others*,³⁸ L'Oréal is a cosmetics company in France. In May 2007, L'Oréal sent a letter to eBay regarding problems on unauthorised sales of its trademarked goods on eBay's European websites. Even though eBay's user agreement has prohibited counterfeit sales and its verified rights owner program to assist trademark owners, L'Oréal claimed that eBay did not prevent the violation. The issue was on seventeen (17) items sold by the individual sellers from non-EU countries. Two items were reported as counterfeit cosmetics bearing L'Oréal's registered trademarks. Other goods were also not intended for sale in the EU or were meant for sale only in North America.

L'Oréal also objected to eBay's use of its trademarks in sponsored online advertisements. When the users were searching for L'Oréal trademarks, like Shu Uemura, on Google, eBay ads appeared which directed the users to eBay's website. L'Oréal claimed that this amounts to trademark infringement. This made L'Oréal to file a case for infringement actions against eBay in many EU countries, including the UK High Court of Justice, Chancery Division.

The Court directed the Trademark owners to be careful when the brands are advertised online and they should make sure that advertisements show their products clearly to avoid trademark infringement. It can be noted that, in the year 2011 itself the connection between technology and trademark arose. This case portrayed how AI played a major role in trademark.

In the case of *Google France, Google Inc. v. Louis Vuitton Malletier*³⁹, the European Court of Justice (ECJ) heard three connected cases involving three luxury brands which are, Vuitton, Viaticum, and Thonet, who accused Google of trademark infringement. The issue arose when the users googled the brands' names, triggering sponsored links to websites selling counterfeit goods or competing products. The brands claimed that Google's use of their trademarks as keywords in its search engine, without permission, constituted infringement. The main issue before the ECJ was whether Google

³⁸ *L'Oréal SA and Others v. eBay International AG and Others* (2011) C-324/09 High Court of Justice (England & Wales), Chancery Division - United Kingdom.

³⁹ *Google France, Google Inc. v. Louis Vuitton Malletier* (2010) C-236/08 ECJ.

could claim exemption as an information society service provider under EU law, which protects hosting services from liability for user-generated content.

The ECJ determined about the intermediaries' responsibility with regard to trademark infringement considering directives and regulations of European Union. The Court stated that the intermediaries are not responsible for trademark infringement, if their role is neutral, technical, passive or without knowledge or control over data.

With regard to AI trademark image recognition, it can be analysed from the case that the search of images using AI does not infringe the trademark if it has been conducted fairly. The above-mentioned Court also recognised the role of AI in trademark.

In the recent judgement of Supreme Court of the United States, *Jack Daniel's Properties, Inc. v. VIP Products LLC*⁴⁰ the issue was that VIP Products marketed a canine toy designed in the likeness of a Jack Daniel's whiskey bottle, including modified branding. Jack Daniel's initiated legal action for trademark dilution and infringement. The US Supreme Court favoured Jack Daniel's, narrowing the extent of parody defences in trademark legislation. As a result, AI-driven brand monitoring solutions now assist organisations in identifying parodic or deceptive use of trademarks. Machine learning techniques aid in evaluating the potential for possible customer misunderstandings arising from a trademark parody. It promotes enhanced legal safeguards against brand deception and AI surveillance for identifying probable trademark dilution. In China, Alibaba Anti-Counterfeiting Alliance uses AI systems to detect any infringement of trademarks and counterfeits on their platform, which has yielded exceedingly good results in preventing infringement of registered trademarks.⁴¹

Since the role of AI in trademark image recognition is an emerging area, the case laws focusing on the same are elusive and yet to emerge in Indian jurisdiction.

⁴⁰ *Jack Daniel's Properties, Inc. v. VIP Products LLC* 599 U.S. (2023).

⁴¹ Trevor Little, "Alibaba Anti-Counterfeiting Alliance seized \$536.2 million in fake goods last year: WTR exclusive", available at: <https://www.worldtrademarkreview.com/article/alibaba-anti-counterfeiting-alliance-seized-5362-million-in-fake-goods-last-year-wtr-exclusive> (last visited on January 29, 2025).

6. Analysis

Private organisations have endeavoured to develop technologies to aid recognition and identification of trademarks in the digital world with the help of Artificial Intelligence. Countries, at national level, have tried to emulate the same, with some fruitful results. India has launched a *Saarathi Chatbot*⁴² to help in trademark identification through AI. However, it is still in the nascent stage and vastly underdeveloped. Knowledge sharing and seeking aid of private companies to model a better version is required as the current model is technologically insufficient. The user interface is not optimum either, but the step taken in this regard is commendable. The world is becoming one unitary global village through leaps and bounds where cooperation is observed, and so is competition in developing technologies. India with its vast population and resources can utilise this niche area well and thus, a developed technology in this regard would be a boon.

In the last two decades, every sector has had an impact from technology and adapted for the better. Industries, workforce, education, healthcare have all accumulated and integrated technology, especially the promises and utilities of Artificial Intelligence. Law is a major exception in this regard where legal systems as well as legal education is exactly similar as it were a hundred years ago. The traditional means of legal knowledge, application and utilities have perpetuated, enforcing this cycle. Similar paper pen driven knowledge and approach is observed in criminal proceedings, court systems and pretty much all areas of legal execution, especially in India. It is necessary now to ‘future proof’ the law and embrace technology to revolutionise the legal field as well. Trademarks are a thing of the future as much as they are an ever-present phenomenon in contemporary business and legal landscape. Hence it is needless to say, that although a novel concept, AI integration is required to enhance and bring in ease in trademark identification, and image recognition for private organisations, but more so at the national governmental level. In the age of globalisation, and especially at the international sphere there is a need

⁴² “New AI-ML Based Trademark Search Technology Announced”, available at: <https://www.foxmandal.in/News/new-ai-ml-based-trademark-search-technology-announced/#:~:text=On%20September%2018%2C%202024%2C%20the,to%20identify%20and%20protect%20trademarks> (last visited on November 25, 2024).

of not only keeping inventory but also making ease of access to registered trademark images in use.

As analysed in this study, this is a legal vacuum and there is a scope for improvement. Other countries have already started developing technology and drafting stringent laws in this regard. India must follow suit. The current infrastructure as observed in *Saarthi Chatbot*, could be considered a commendable first step with a lot of advancements to make, a lot more difficult terrain to traverse.⁴³ India could become the next superpower of tomorrow and it cannot become so with an aversion to or inadequacy in its technology. Stringent laws to govern and regulate the same is naturally concomitant with it and this change must start at an interdisciplinary level, with joint efforts from various sectors which include technology, legislation and formulating adequate policy.

7. Conclusion

With India's economy expanding and the significance of IP protection growing, there is a lot to explore in the effectiveness of AI-driven trademark image recognition within the country. The Intellectual Property Office on Government of India now runs the only AI-driven trademark image recognition system in use which is *IP Saarthi Chatbot*. This technique's low level of depth and restricted features have drawn controversy because they can result in imprecise findings and unproductive time spent processing them.

India's existing AI-driven trademark image recognition technology does not have the highly sophisticated capabilities and operations seen in more modern systems and is based on old techniques. For example, the system's inability to effectively identify and differentiate between similar photographs may result in inaccurate results and disagreements. Additionally, it may be challenging to perform thorough searches and analyses due to the system's lack of interconnection with additional databases and platforms.

There is an obvious need for more intricate and advanced systems given the deficiencies of India's current AI-driven trademark image recognition technology. In

⁴³ "Shri Piyush Goyal unveils AI and ML-based Trademark Search Technology, *IP Saarthi Chatbot*", available at: <https://pib.gov.in/PressReleaseIframePage.aspx?PRID=2056435> (last visited on November 27, 2024).

addition to being connected with other appropriate files and systems, these type of systems would have the ability to precisely identify and differentiate between comparable images. This will make it possible to handle trademark applications more quickly and effectively, which would support Indian economic growth and innovation. Increased protection for trademark owners and assistance in preventing infringement and fraud are further benefits of modern systems.

Several more steps can be generated to improve the effectiveness of AI-driven trademark recognition of images in India. It is vital to strengthen laws and regulations since the current structure could not be adequate to handle the complexity of trademarks created by Artificial Intelligence.

In order to clearly specify authorship and ownership of AI-generated trademarks, the Trade Marks Act of 1999 must be amended by adding and connecting technology or AI legal provisions with trademarks.

It is also fundamental to promote education and raise awareness. Companies, legal experts, and the general public can all benefit from holding conferences, seminars, and campaigns to better grasp the potential consequences of AI-driven recognition of trademark images. A society that is supportive of creativity and understanding of intellectual property rights may result from this.

The efficacy and precision of recognition of images can be greatly increased by utilising advanced AI tools. Higher-level of AI algorithms and machine learning models can be used to recognise and differentiate between similar photos, lowering the possibility of wrong conclusions.

Managing the worldwide significance of AI-driven recognition of trademark images requires promoting engagement and international cooperation. India can work with other nations to create uniform rules and regulations for AI-generated trademarks and learn from international examples of excellence. If all these measures are taken and implemented, we can see an advancement and the AI driven trademark image recognition will be more effective and stronger in India.

Therefore, the study highlights the effectiveness of Artificial Intelligence-driven trademark image recognition in India and shows how it has the capability to completely

transform the trademark registration system and other related processes. India's current trademark law framework is still insufficient to properly utilise AI-driven technology. In order to fully embrace AI tools and ensure their efficient use while preserving the integrity of the trademark registration procedure image search, the Indian legal system must modernise. To improve the efficacy as well as precision of trademark image recognition in India, additional AI-driven solutions must be developed and used immediately. India can improve its intellectual property laws and create a more favourable atmosphere for both companies and entrepreneurs by tackling these issues and welcoming AI-driven accomplishments.