

ONLINE SHOPPING AND CONSUMER PATTERNS IN THE ERA OF ARTIFICIAL INTELLIGENCE: A CRITICAL EXAMINATION OF TRADEMARK LAW IMPLICATIONS

Dr. Ankit Singh*

Abstract

With the advent of artificial intelligence (AI), online shopping patterns has been dramatically reshaped. Consumer behaviour has undergone a significant shift as well. This has opened up a new avenue of inquiry in the realm of trademark law. In this article, the author attempts to explore the fertile intersection of online shopping in the era of AI and trademark law. The author plans to critically examine the impact of AI-driven technologies on consumer purchase patterns, consumer behaviour and consumers' brand perception. The author addresses the challenge of use of AI-powered tools such as chatbots, virtual assistants, and recommendation engines and their impact on blurring out the lines between different business entities. Concerns pertaining to trademark enforcement and protection brands' distinctive identities are also addressed by the author. The author aims to underscore the challenges posed by AI in securing the distinctiveness and integrity on trademarks in the online marketplace. The role of intermediaries such as online shopping platforms and AI developers in preventing the instances of consumer confusion and trademark infringement, and ensuring fair competition in the digital marketplace is also examined by the author.

The author, through a systematic analysis, aims to propose potential legal reforms and policy recommendations to adapt trademark regulations to the AI-driven shopping landscape, ensuring robust protection for brand owners while balancing innovation and consumer interests.

Keywords: Artificial Intelligence (AI), Online Shopping, Trademark, Infringement, Consumer

* Assistant Professor of Law, DPIIT-IPR Chair Professor & Head, Centre for Innovation & IP Laws (CIPL), Hidayatullah National Law University, Raipur (C.G.).

INTRODUCTION

In the past years, the way in which products and services are purchased has changed drastically, and technology has played a vital role in triggering this change. Traditional shop model wherein a shopkeeper behind the counter shows goods and services to the consumers to influence their purchasing decision is not the only method now. With the evolution of modern supermarket chains, the Victorian model of shopping has changed significantly. Consumers these days do not only rely on the shopkeeper's advice these days. Consumers have become increasingly aware with the growth of modern supermarket system.

Consumers are served in-depth information through modern branding techniques, direct brand cues, etc., which create visual or conceptual impact. In the modern supermarket system, brands now communicate directly with the consumers and can influence their purchasing patterns and decisions.

With the advent of technology and internet shopping, consumer patterns have undergone a paradigm shift. Product availability increased exponentially along with information related to the product and consumers' knowledge. Giving the entire control over purchasing decision to the consumer has brought about a marketing revolution in the 21st century.

Another huge step in this direction was the emergence of social media, influencer marketing and performance marketing. With the introduction of this form of marketing, consumers and their buying decisions started getting influenced in a whole new way. Consumers around the world have started attributing value to the product depending on its emphatic presence on social media, paid promotions through social media influencers and even endorsements by sports and entertainment celebrities.

Buying process in the online market has undergone another overhaul with the most recent years with the introduction of AI-powered software and apps such as Alexa, Google Home, Amazon Dash, etc. Apart from these, AI-powered chatbots and shopping assistants such as Mona, Pepper etc., have also brought about a significant change in the life of a consumer and the way they make their everyday buying choices. Interestingly, in a sense, with these AI-based assistants, the old Victorian model, where the shopkeeper acted as filter between the consumer and the seller, has

made a comeback. However, there are some significant and fundamental differences between the Victorian model of shopping and AI-model of shopping.

I. IMPACT OF AI ON BUYING DECISIONS

AI usage by an average consumer is still relatively limited. However, every consumer in current times has used some or the other AI application to assist them in online shopping on various retail platforms such as Amazon, Flipkart, etc. It would be fair to assume that these AI applications act as a filter between the consumer, the product or service, and the brand selling the said product or providing the said service. As a filter, these AI-based apps provide unique recommendations based on their purchasing history and other buying patterns.

AI applications have comprehensive access to available information relating to products and services available in online marketplaces. It might be possible that majority of consumers would not choose to delegate their buying decision to an AI app, but these apps can efficiently act as a personal shopper of consumers based on the information they hold. Therefore, once a consumer realizes the true power of an AI application relating to picking out the right product/service, they may very well choose to completely delegate the power of making a buying decision to these apps.

There are two prominent AI models when it comes to online shopping:

(1) Automatic Execution Model

Automatic execution model or automatic execution strategy involves the consumer authorizing a company to handle their buying decisions after which the company takes care of everything. Element of trust, comprehensive customer information and impeccable anticipation by the company are the three essential pillars on which this model rests.¹ Customers usually have no problem sharing their data with companies they strongly trust. It is an efficient mechanism whereby their shopping needs get fulfilled at fair reasonable price, and without any harm to their privacy.

Say Mr. A has bought a printer, and along with his purchase he authorizes the manufacturing company to remotely monitor his ink usage and send him new toner whenever he is low on ink. Thus, through this model, the onus to fulfill Mr. A's needs is

¹ Nicolaj Siggelkow & Christian Terwiesch, *The Age of Continuous Connection*, Harvard Business Review (2019), available at: <http://hbr.org/2019/05/the-age-of-continuous-connection> (last visited on Feb. 20, 2025).

shifted to the company and Mr. A is spared of any unnecessary hassle of going out in the market or even online whenever he is low on ink, comparing various similar looking products and then finally making a purchasing decision.

(2) Predictive Retail Model

This model is still at its developmental or evolutionary stage. The predictive retail model ought to have great accuracy to gain consumer traction. Predictive retail model and trademark law have a close connection as this model gives rise to certain questions with regards to “post-sale confusion” and other similar matters. It is practicably obvious for the customer to get confused on receipt of a product if initially he had no part to play in making purchasing decision in relation to such product. Conventionally, post-sale confusion concerns third parties and not the purchaser. However, with this model, post-sale confusion also reaches consumers.

1.1 Artificial Intelligence and Brand Perception

INTA’s research paper has argued that as artificial intelligence becomes increasingly pervasive, companies are exploring ways to take advantage of the opportunities it affords to better understand and target relevant consumers. One of the concerns that brands across the globe have been the kinds of implications AI may have when it comes to product selection and purchase as they apprehend that it might eventually devalue the role of trademarks. AI is utilized by various smart devices to efficiently streamline the purchasing process. This has the effect of minimizing or even eliminating participation of consumers in making buying decisions. For example, LG produced a smart refrigerator² that was powered by Amazon Alexa. It automatically detects if a customer is running low on grocery items and orders the same for it to be delivered on their doorstep thereby completely eliminating the need to go to the grocery shop. AI gathers data about a consumer’s past purchasing decisions and habits from the e-commerce platform which they use, and automatically makes future buying decisions without needing any input from the consumer.

AI algorithms continuously function in the background while consumers under the illusion of controlling their selection and buying decisions while shopping online. AI’s predictive analytics

² Retail Dive, *LG introduces smart refrigerator with Amazon Alexa-enabled grocery ordering*, available at: <https://www.retaildive.com/news/lg-introduces-smart-refrigerator-with-amazon-alexa-enabled-grocery-ordering/433366/> (last visited on Feb. 24, 2025).

and technique make sure that the consumers get the most optimum product suggestions.³ This results in less direct participation of consumers in online shopping, and a significant reduction in consumer-brand interaction.

AI and big data analytics have emerged as effective tools to target relevant consumers, and this enables AI to assume responsibility for automatically setting consumers' brand and buying preferences. This technological intervention has made it difficult for brands to target customers at the critical point of sale.⁴ This introduces unique challenges for start-ups and other brands that are trying to acquire market share by targeting the customers of their competitors as they could already be acquired by offering attractive subscriptions or previous purchasing decisions. AI has brought in major disruption in the market making organic customer acquisition in the domain of online shopping very tricky.

Another risk that this AI-powered shopping poses is the gradual elimination of brand preferences since it allows customers to set default preferences which are completely unrelated to the brand. For example, a customer setting a preference to always purchase the “cheapest available product”, will always eliminate the products of a particular brand from search results. This phenomenon that results in buying decisions having no direct relation to the brand name is called “brand washing” which adversely impacts trademark owners. This does not even allow the previous brand preferences to enter the already set AI algorithm. This reliance on AI algorithms to employ generic purchasing preferences definitely impacts the business of brands, and also has negative impact on the consumers. Trademarked products ensure certain standards and quality. Purchasing brandless products based on the AI-powered algorithm and going for the “cheapest available option” provides an opportunity to the retailers to make undue profits by reducing prices, and by compromising product quality. On the other hand, if the consumer to opt for “highest rated product”, it gives an opportunity and incentive to popular brands to enhance the quality of their products and services and keep up with consumer demand.

³ Amit Sharma, *How Predictive AI will Change Online Shopping*, Harvard Business Review (2016), available at: <https://hbr.org/2016/11/how-predictive-ai-will-change-shopping> (last visited on Feb. 24, 2025).

⁴ Nick Couldry & Joseph Turow, *Advertising, Big Data and the Clearance of the Public Realm: Marketers' New Approaches to the Content Subsidy*, 8 International Journal of Communication 1710 (2014).

1.2 Brand Owners Leveraging AI to Influence Purchase Decisions

With the emergence of AI, marketing techniques have also undergone a significant change. Online shopping has become ever more convenient for consumers. One such feature is the voice detection technology that allows consumers to make their purchases while interacting with a digital assistant. Another one is a software that traces and learns consumer's preferences on the basis of which it suggests products and services.

This new wave of digital advertising and online shopping puts brands under a lot of pressure and constantly on their toes. It is crucial for brands to understand what metric will position their product/service as the preference for a particular e-commerce platform. This means whenever a customer visits a website then his action will trigger the featuring of a particular brand's products on the said customer's social media feed. This kind of brand positioning can be achieved only by maximum traffic on their own website. Traditional ways of driving traffic towards a website like offering discount coupons (knowns as "eblasts") have become obsolete, and brand owners have become increasingly creative. Currently, for example, instead of sending eblasts, brands have transformed their emails into "teasers" where a potential customer must click the provided link in order to find more details about any particular offer or deal.

AI is also more than capable of gathering data and predicting consumer behaviour which may include as minute a detail as the usual time of opening email. The data gathered by AI is used to select the most optimum time to send promotional materials to individual customers. AI-curated individual experiences is another way by which brand owners are targeting customers. From selecting the layout of an eblast to the exact timing at which a customer is most likely to access to and least likely to ignore it, brand owners have locked in the perfect AI-powered promotional strategy. It has become imperative for brands to keep up with the changing landscape of AI in the domain of online shopping and digital marketing. AI has significant influence on consumers' buying decisions, and it is important for companies to keep abreast of the latest trends that consumers are following. Let us take voice recognition technology as an example to understand the issue better. Consumers appreciate the convenience that this technology offers as it enables them to search for products and services while performing their other daily tasks. This technology also enables also consumers to do online shopping using a single interface rather than browsing through multiple websites.

With a great number of people resorting to online shopping, data related to personal shopping choices and behaviours is also available easily for brands to exploit through AI. Online marketplaces are also capitalizing on this data and customizing their homepage for individual customers based on their personal shopping habits and preferences. However, this raises questions relating to consumer privacy as majority of them do not want to share data relating to their buying habits, internet browsing patterns, or any other metrics. Typically, brands are able to enhance their exposure and garner consumer trust through transparent marketing practices and offering expansive conveniences to consumers in return of their personal metrics.

II. THE INTERPLAY BETWEEN AI-DRIVEN CONSUMER DECISIONS AND TRADEMARK LAW

AI-powered shopping has a strong relationship with trademark law and significant implications on its application. Trademark law addresses shopping patterns and processes, the way in which products are identified and selected by consumers, and the overall interaction between a brand and consumers.

In essence, trademark law is based on the concepts of an average consumer's imperfect recollection and human's imperfect memory. Consumer confusion, imperfect recollection, trademark slurring are the basic tenets on which trademark law is built. In other words, the aural, conceptual and visible aspects and comparison of various marks available in the market is what constitutes the fundamental subject-matter of trademark law. The aforementioned aspects of trademark law were enhanced with the increase of supermarket shopping. However, it appears that with rise of AI, and decreased interaction between consumers and brands, the same aspects have become less important. Trademark law has very little role to play when consumers are left with little or no choice while purchasing a product.

2.1 Use of AI in Trademark-related Administrative Procedures

According to an index released by the World Intellectual Property Organization (WIPO), patent offices throughout the world are using AI to improve the accuracy and efficiency of their transactions. The following are a few examples of AI being used in trademark application and registration procedures:

- a. Comparative assessment of similarities between marks;
- b. Scanning databases for detection of prior similar marks for clearance purposes; and
- c. Automating some other ancillary procedures

AI is being utilized by patent offices to monitor and identify online infringement and unlawful use on e-commerce and other online platforms, in addition to the standard administrative processes. AI can prove to be of great assistance for both trademark owners and practitioners in enforcement of their trademark in various marketplaces.

Through the years, searching for word marks has been an easy and straight forward task. However, searching for similar logos, symbols or device marks that include figurative elements has been very limited and expensive. AI has proved to be extremely effective in tackling these trademark search challenges. AI can be utilized to obtain targeted and optimum results while ensuring efficacious enforcement for brand proprietors.

In April 2019, WIPO had announced the launch of an improved AI-powered technology that employs deep machine learning to identify a combination of various mark concept embedded in a trademark image/graphic which helps in searching for similar registered trademarks.⁵ This tool makes it easier and faster to ascertain the distinctiveness of a trademark in the targeted marketplace which also results in cost-saving for examiners. This tool is also available free of charge to all trademark practitioners through WIPO's Global Brand Database. The search functionality has an impressive coverage of 45 trademark offices, and can be effectively used even if a particular office does not have classification system in place for figurative elements. This AI-powered search mechanism ensures that the algorithm combines other effective search criteria such as geographical location, jurisdiction and other classification methods for products/services.

In addition to WIPO's AI-powered searching system, the mechanism itself is advancing through various other means and resources. In June 2019, "TradeMarker" emerged as a significant advancement over other AI-based searching platforms out there, and was also discussed in an article published in the World Trademark Review. TradeMarker is an advanced AI search platform that works upon four key areas or criteria of similarity – content similarity, text similarity, image

⁵ World Intellectual Property Organization, *WIPO Technology Trends 2019: Artificial Intelligence*, available at: https://www.wipo.int/pressroom/en/articles/2019/article_0005.html (last visited on Mar. 02, 2025).

similarity, and manual input related similarity – to conduct trademark similarity searches.⁶ Human interaction is also needed to rank the results from every search domain, but with AI assistance, the search success rate of the system is almost 80%, while saving resources and time considerably. It is clear that with these AI-assisted platforms, trademark enforcement will be affected significantly. AI-assisted mechanism will result in improved and affordable searching attainable by proprietors and brands of all sizes.

Many of the current AI-assisted systems have a limitation. They search only the trademark databases and registries from participating jurisdictions and those jurisdictions which have database access. These limitations generally exclude searching for unregistered images and references on the internet which are not the subject of a pending trademark application or existing registration in participating jurisdiction.

AI-assisted technologies should also be considered and understood in the context of general trademark law principles. One of the core functions of a trademark is to act as a source identifier for goods and services and to assist consumers in differentiating one brand from the other, where the average consumer is the one who is of ordinary prudence and reasonably well-informed. In current times, the pace in which online shopping is done, this “average consumer” has practically no time or opportunity to compare good or services of one proprietor with the other. It is generally assumed that such consumer is acting on his imperfect memory or perception. It is upon this assumption of “imperfect recollection” that the assessment of deceptive similarity or likelihood of confusion is carried out. However, with the advent of AI-powered technologies, the traditional methods of shopping have changed. With AI assistant playing a crucial role in determining consumers’ purchasing preferences and decisions, and shopping being conducted directly and automatically by AI with consumers’ voice command or even on its own, the traditional constructs of “average consumer” and “imperfect recollection” has gotten blurred.

The technological developments and interventions have totally transformed the processes of shopping – from making buying decisions based on physically looking at the products on shelves and windows to a process where these decisions are guided and even made for us by some AI assistant. The emotional, social and cultural aspect of shopping is dwindling. The sentimental bond

⁶ Idan Mosseri, Matan Rusanovsky & Gal Oren, *TradeMarker - Artificial Intelligence based Trademarks Similarity Search Engine*, Conference Paper, ResearchGate, 2 (2019).

between a brand and a consumer has become a mere technology-driven transaction. This necessitates reconsideration of traditional principles of trademark law such as “average consumer” and “likelihood of confusion” which is based on the ordinary intelligence and imperfect recollection of an average human being.

When it comes to fixing liability in trademark infringement cases, these AI-powered applications have an important role to play in determining as to who would be considered as the “average consumer” in such proceedings. For example, if an AI assistant directly purchases a product involving little or no human interaction, then the question arises that who or what would be taken as the average consumer, and who or what would be liable for a purchase that results in trademark infringement.

2.2 Trademark Infringement and AI: An Interesting Perspective

It is an interesting discussion to look at infringement liability and AI. At its core, the trademark’s primary function is to avoid consumer confusion that may arise due to deceptive similarity. With high-level machine learning, training and data processing, AI can process vast amounts of intricate datasets. This enables AI to distinguish between similar trademarks which an average consumer could never do. Therefore, if AI is making purchasing decisions for humans, the conventional concept of consumer confusion which is a human phenomenon, gets eliminated.

It is argued that the standards for determining trademark similarity should be revisited with AI-driven decision-making getting more and more common in recent times. With its sophisticated training, the possibility of AI getting confused by phonetic or visual similarity of trademarks is almost zero. Most definitely, AI’s capability of distinguishing between similar marks is far more superior than humans, and that is why it is argued that the standard by which we see phonetic, visual or conceptual similarity between trademarks need some rework in the current scenario.

Emphasis is usually given on visual, phonetic and conceptual similarities while determining likelihood of confusion that may be caused due to similarities between two conflicting trademarks. However, these factors may become less effective as consumers’ involvement becomes minimal in decision-making process while purchasing products or services. Human cognitive processes mainly function by assessing visual and phonetic aspects of a mark which are overshadowed by

AI-driven systems that use large datasets and algorithms to effectively recognize and differentiate between similar trademarks.

With the advent of smart devices and assistants that function on voice commands, phonetic similarity of marks has become more important than before. Consumers have adopted the trend of verbal interaction with these AI-assisted voice-activated devices which has made phonetic similarity between trademarks much more significant. Thus, it is argued that in matters of infringement analysis in current times, more weight should be attributed to phonetic similarity between conflicting trademarks.

2.2.1 Keyword Advertising and Trademark Infringement

Google's trademark infringement liability was discussed in *Louis Vuitton v. Google France*⁷ where the issue of keyword advertising involving automatic choice of keywords in Google's AdWords program was the main issue. It was noted that unless Google was directly participating in the keyword advertising scheme, it could not be held accountable for trademark infringement.

2.2.2 Online Marketplace and Counterfeit Goods

In "*L'Oreal SA v. eBay International AG*",⁸ the problem was the sale of fake products on eBay's online platform. Similar to the Google-LV case, it was held that eBay could not be held responsible for infringement of trademark unless they were aware of the specific activities involving the sale of counterfeit items on their site.

Therefore, in the area of online marketplaces, it appears to be an established principle in European jurisdiction that if AI service providers have employed an effective takedown mechanism, and are not actively aware of infringing activity, they cannot be held liable for trademark infringement.

2.2.3 Involvement of AI Provider in Infringing Activity

When trademarks were used to direct visitors to a website that was unrelated to the brand, the UK High Court ruled Amazon liable for trademark infringement. Customers in this scenario were unable to determine whether the goods being offered were coming from the owner of the brand or

⁷ [2011] All E.R. (EC) 411

⁸ [2011] R.P.C. 27

someone else.⁹ There have been many other similar cases where Amazon was held liable for trademark infringement. One such case was before the Federal German Court involving Ortlieb Sportartikel GmbH. In this case, searching the term “Ortlieb” triggered ads on Amazon.de based on product descriptions and consumer behaviour

III. AI-DRIVEN MECHANISMS AND TRADEMARK INFRINGEMENT: AN INSIGHT

There are various ways in which AI-powered algorithms can contribute to trademark infringement. Understanding the fundamental aspects of AI-assisted shopping and trademark infringement becomes essential. We can summarize the concept through a few key points:

- (1) *Detection of Trademark Infringement*: E-commerce platforms these days widely use AI-driven algorithms to detect trademark violation incidents. But these algorithms face significant challenges when it comes to accurately identifying distinctive or distinguishable trademarks. This is mainly because AI-assisted systems primarily depend on text-based analysis and detecting unauthorized use of marks in visual aspects/figurative elements such as images or logos is quite difficult. This is a serious limitation in effective identification of trademark infringement and further enforcement.
- (2) *Automated Recommendation Systems*: To enhance the shopping experience of customers, e-commerce platforms employ automated listing and recommendation systems. The main purpose of this system is to suggest products and services to customers based on their past purchasing decisions and consumption patterns. The main problem is that in the process of making product recommendations, these systems might also suggest fake or counterfeit products which impinge on the trademark rights of the authorised proprietor. These instances mainly occur when the system bases its decisions on product review or algorithm biases that are focused on imitation or rip-off goods.
- (3) *Keyword Searching*: Almost all search engines and online marketplaces in today’s day and age employ keyword-based searching. In many cases, these search results may irrationally prioritize one product over another having similar names or descriptions, which may also lead to trademark infringement. This majorly contributes to online trademark infringement

⁹ *Cosmetic Warriors Ltd and Lush Ltd. v. Amazon.co.uk Ltd. and Amazon EU Sarl*, [2014] EWHC 1316 (Ch)

and dilution, which is also widely recognized by scholars and jurists as invisible infringement or keyword infringement.

- (4) *Ad Placement and Sponsoring*: Recent trends in digital marketing involve AI-powered algorithms that trigger display of sponsored results which may infringe trademarks. Advertising platforms generally rely on user search inputs and browsing history to show targeted ads to the consumers. However, these ads sometimes inadvertently promote counterfeit products and tend to make unauthorized use of trademarks.

Enhanced collaboration between e-commerce platforms, trademark proprietors and regulatory authorities is essential to combat these challenges. There are some solutions that may be effective in this regard¹⁰:

- (1) *Updated and Improved Systems for AI Detection*: AI systems have to be updated with the current digital trends to accurately and quickly detect trademark infringement, which may also include visual recognition capability. To ensure accurate detection of unauthorized use of trademarks, more rigorous training of AI algorithms is needed with respect to a broader set of image data.
- (2) *Stringent Content Moderation and Listing Policies*: It is needed that e-commerce platforms implement strict parameters for content moderation and product listing. This will help tackle the listing of counterfeit or infringing goods. Other processes such as periodical auditing, user reporting mechanisms, strict penalties for infringers should also be in place to keep these issues in check.
- (3) *Collaborative Efforts*: Efficient collaboration should be established between e-commerce platforms and brand proprietors to share pertinent information about the status of a trademark, ownership, registration and enforcement. This will enable these platforms to improve detection mechanism and make the reporting and takedown processes swifter and more effective.
- (4) *Enforcement Mechanism*: In this regard, regulatory authorities have a pivotal role to play. It is important that robust legal frameworks be established to protect trademark from

¹⁰ A. Moerland & C. Kafrouni, *Online Shopping with Artificial Intelligence: What Role for Trade Marks?*, in *Research Handbook on Intellectual Property and Artificial Intelligence* 290, 290-308 (Edward Elgar Publishing, 2022).

unauthorized use. These frameworks should be able to combat challenges posed by AI-powered algorithms and e-commerce platforms.

To mitigate risks relating to trademark infringement caused by AI-powered algorithms, joint efforts from all stakeholders is the need of the hour. This will also help ensure a safe and authentic shopping experience for consumers in online marketplaces.

3.1 Techniques Employed by Infringers

Infringers have become increasingly adept with technology and AI. They utilize several techniques to manipulate and deceive online shopping platforms.¹¹ These may be summarized as follows:

- (1) *Keyword Shuffling*: To manipulate search algorithms and increase their visibility on e-commerce platforms, infringers excessively use trademarked terms and phrases during product listings. The aim is to attract users who are searching for a specific brand or product through manipulation of keyword density.
- (2) *Image Manipulation*: With advancements in image recognition technology and automated detection systems, infringers are still able to bypass these through image manipulation. They strategically alter logos or use slightly modified designs to put counterfeit goods on e-commerce platforms. Thus, it becomes quite challenging for AI-powered algorithms to accurately detect trademark infringements solely on image recognition.
- (3) *Manipulation of Brand Particulars*: Infringers also resort to manipulating product descriptions, textual content and even brand details to escape automated detection. They make nominal changes to brand names or misrepresent the nature of their goods to deceive the consumer. They very cleverly make slight modifications to the metadata to deceive both AI algorithms and consumers.
- (4) *Misrepresentation*: To represent their fake products as genuine, infringers make false representation as to the authenticity and origin of those products. They also resort to

¹¹ X. Liu, C. Li & J. Zhang, *A Hybrid AI Approach for Trademark Infringement Detection on Chinese E-Commerce Marketplaces*, Proceedings of the International Conference on Artificial Intelligence and Computational Intelligence 345 (2012).

producing fake certifications and false documentation to deceive consumers. This makes it difficult for AI-powered algorithms to detect potential infringements.

Infringers are rampantly using social media and e-commerce platforms as tools to promote their counterfeit products. They also engage social media influencers to advertise their fake products creating an illusion of authenticity and popularity. Consumers often get bamboozled because they believe the word and recommendations of their favourite influencer.

Infringers also make significant price cuts to attract consumers that are looking for reasonably priced products. By offering fake products at cheap costs, they manage to persuade potential consumers to overlook originality and authenticity parameters. This technique generally works on price-sensitive class of consumers. This is precisely the reason why e-commerce platforms and brand proprietors should always be on their toes and implement advanced AI-powered algorithms to combat these tactics. Proper monitoring, active enforcement mechanism, and effective joint efforts with regulatory authorities are some crucial measures that can be taken to fight against trademark infringement and counterfeiting in digital marketplaces.

3.2 AI-Powered Counterfeiting Networks

After looking at the various tactics that infringers employ to dupe consumers on digital marketplaces, let us delve deeper into the functioning of these highly sophisticated AI-powered counterfeiting networks¹²:

- (1) *Advanced Manufacturing Techniques*: AI-powered counterfeiting networks employ highly sophisticated techniques to manufacture fake goods that are deceptively similar to authentic products resembling the core brand identity. These networks use advanced AI algorithms to assess product designs, manufacturing materials and processes to replicate the looks and functionality of legitimate products. These networks often operate surreptitiously out of hidden factories where AI-powered machines facilitate the manufacturing process.

¹² K. Kammel, J. Kennedy, D. Cermak & M. Manoukian, *Responsibility for the Sale of Trademark Counterfeits Online: Striking a Balance in Secondary Liability while Protecting Consumers*, 49 AIPLA Q.J. 221 (2021). *Counterfeits Online: Striking a Balance in Secondary Liability while Protecting Consumers*, 49 AIPLA Q.J., p. 221

- (2) *Logistically Sound*: AI algorithms play a significant role in the supply chain management of counterfeit products. They optimize logistics and ensure smooth transportation, warehousing and even inventory-keeping. By using techniques like decentralized distribution networks, fake product labels, and hidden compartments in shipments, these AI-controlled system escape detections by authorities.
- (3) *Manipulation of Online Platforms*: These networks manipulate e-commerce platforms and other online marketplaces to penetrate through a wider customer base. Creating convincing product listings, manipulating search rankings and luring consumers through targeted advertising are some of the tactics that these AI-powered algorithms perform. To compete with authentic dealers, these networks usually employ algorithmic pricing and still maintain their profit margins.
- (4) *Leveraging Social Media*: These networks exploit various social media platforms and employ influencer marketing strategies to promote and market counterfeit products. Through AI algorithms they identify most popular social media influencer, and develop aggressive marketing campaigns to attract consumers at a large scale. Through influencer collaboration and targeting specific demographics, they achieve a level of credibility among the customers which consequently increase the chances of their success in the market.
- (5) *Escaping Enforcement Mechanism*: These networks utilize various sophisticated techniques to escape detection and enforcement mechanisms. They used advanced E-commerce platforms find it very challenging to differentiate between authentic merchants and counterfeiters due to AI algorithms that mimic real user/seller behaviour. Additionally, they create plans to address anti-counterfeiting techniques including watermarking, image recognition software, and verification codes.

These networks have emerged as a significant threat and pose hard challenges for both regulatory authorities and genuine businesses. Continuous efforts and innovation are required in the domain of anti-counterfeiting strategies to keep up with these networks. Business owners, enforcement authorities and digital platforms should come together to launch collaborative action against this ever-evolving threat of AI-powered counterfeiting networks.

IV. DISCUSSION AND CONCLUSION

This contemporary era of digital shopping heavily influenced by AI-powered algorithms and assistance, presents fresh challenges and opportunities for brand proprietors. Consumers' increasing reliance on AI in making buying decisions due to the sheer convenience it offers is resulting in weakening interactions between consumers and trademarks making the traditional consumer-brand relationship fade away slowly. It is imperative for businesses to adapt to the growing utilization of AI to understand the changing consumer patterns to make the most of the trend. Brand owners need to understand the contemporary demands of consumers to establish loyal relationships. It will also help them effectively project their brand in the highly competitive digital marketplace. With rapid changes in AI-driven purchasing processes and pattern, brand owners have to be continuously on their toes to remain current and relevant.

Instead of perceiving AI as a threat to their business, proprietors should look at AI as an opportunity to maximize the potential of their business and to reach a wider client base. Marketing and business strategies should be redesigned to accommodate AI-assisted consumer base.

Safeguarding the distinctive identity of their trademarks, combating counterfeiters, and quick detection of infringing activity caused by AI-powered algorithms, are some key challenges which require persistent focus of brand owners. It is quite certain that businesses in the current digital landscape can only survive and thrive by embracing AI as a reality rather than escaping it as a threat.

It is imperative for policy-makers around the globe to diligently devise statutory instruments to tackle the infringers and counterfeiters who use AI-powered tools to mislead and defraud consumers. Collaboration and synergy between the government and brand owners is the need of the hour to combat the contemporary challenges in relation to AI in online market. Consumers are the ultimate beneficiary, and it is the legal duty and moral responsibility of the policy-makers to ensure that when it comes to online shopping, AI-powered tools are utilized to extend benefits to them, and not be detrimental to their interests or the interests of the proprietors who build a credible business after significant investment and hard work.

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