



## A Comprehensive Analysis on Challenges Navigating Digital Piracy and Virtual Counterfeiting

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### Introduction

According to a report by OECD (Organisation for Economic Co-operation and Development) published in 2016, the international trade in counterfeited and pirated products amounted to a total value of USD 509 billion, which represented up to 3.3% of the world trade.<sup>2</sup>

Despite legal provisions and regulations, if digital piracy remains unchecked and not monitored, India's video sector and industry could lose USD 2.4 billion by 2029.<sup>3</sup>

The process of illegally copying or distributing any copyrighted material on the Internet, is known as digital piracy. This includes materials like movies, music, software, books and any other material that has the potential to be illegally copied and distributed via the Internet.<sup>4</sup> Due to the recurring expanding scope of the Internet, it has also resulted in a sudden stride of virtual counterfeiting. It is defined as the fraudulent imitation or the replica of the original digital product, which is sold at a lower price than the original product, which is done virtually. There has been the growth of fake and manipulated standard virtual goods like fake online shopping forums, NFTs, fake digital certificates, fake courses, and many more.<sup>5</sup>

This topic is relevant in contemporary age because the new economy which engulfs the world in today's age is a virtual one, comprising of a rise in streaming services, metaverse facilities, crypto investments and assets, cross-border trade done within seconds online and the surge in

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<sup>2</sup> Organisation for Economic Co-operation and Development (OECD), *Trends in Trade in Counterfeit and Pirated Goods* (2019), [https://www.oecd.org/content/dam/oecd/en/publications/reports/2019/03/trends-in-trade-in-counterfeit-and-pirated-goods\\_g1g9f533/g2g9f533-en.pdf](https://www.oecd.org/content/dam/oecd/en/publications/reports/2019/03/trends-in-trade-in-counterfeit-and-pirated-goods_g1g9f533/g2g9f533-en.pdf).

<sup>3</sup> "Despite legal safeguards, digital piracy set to cost India's video sector \$2.4 billion by 2029: Report," ETGovernment, May 6, 2025, <https://government.economictimes.indiatimes.com/news/economy/despite-legal-safeguards-digital-piracy-set-to-cost-indias-video-sector-2-4-billion-by-2029-report/120923533>.

<sup>4</sup> INTERPOL, *Digital Piracy*, <https://www.interpol.int/en/Crimes/Illicit-goods/Shop-safely/Digital-piracy> (last visited Sept. 25, 2025).

<sup>5</sup> Conventus Law, India – Counterfeiting in the Virtual World (Apr. 2, 2017), <https://conventuslaw.com/report/india-counterfeiting-in-the-virtual-world/> (last visited Sept. 25, 2025).

demand of online ten-minute delivery services to a person's doorstep. To prevent the trade of illegally imitated copyrighted material and to protect the patented creations created on various online platforms, from being virtually counterfeited and pirated by efficient applying Intellectual Property Rights (IPR) laws, an analytical, tailored and a methodical study is needed to formulate legal, technical and coordinated solutions to prevent such incidents from occurring in today's crucial virtual age.

## **Historical Background**

Digital piracy has its origins and foundations built in the decade of 1980s. Before the existence of widespread broadband internet, CDs and DVDs were the main sources to be pirated. Copying movies and music on CDs and DVDs existed before the advent of digital privacy and these sources were sold in the grey market. In US, many cam-cording movies were recorded on DVDs, cassette tapes and were sold in local markets. They were also smuggled to other countries.<sup>6</sup>

From floppy disks, CDs and DVDs they were evolved to peer-to-peer (P2P) networks.

There was also a rise in the establishment of warez groups. These groups used to steal music, movies, games and other software from the Internet, used to record, process and distributed them in P2P networks.<sup>7</sup> P2P networks are de-centralized communicational frameworks in which each people can share files or other resources to each other without the need of a centralised system.<sup>8</sup> Music piracy was also observed due to weak DRM (Digital rights management) structures. DRM prevents the duplication and replication of music and effectively utilizes copyright management.

The introduction of video tapes resulted in the culmination of: "Sony Corp. v. Universal City Studios (1984)", where it was primarily held, "if a device is sold for a non-copyright infringing, legitimate and a lawful purpose, its manufacturer would not be held liable for the copyright infringement done by the users of the device."<sup>9</sup>

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<sup>6</sup> Virupakshi R., *Conspiracy of Pirated Movies: Threats and Remedies*, 1 Jus Corpus L.J. 192 (2020).

<sup>7</sup> FBI, *International LEOs Target Criminal Warez Groups*, May 17, 2004, [https://archives.fbi.gov/archives/news/stories/2004/may/piracy\\_051704](https://archives.fbi.gov/archives/news/stories/2004/may/piracy_051704) (last visited Sept. 25, 2025).

<sup>8</sup> ScienceDirect, *Peer-to-Peer Networks — an overview*, ScienceDirect Topics, <https://www.sciencedirect.com/topics/computer-science/peer-to-peer-networks> (last visited Sept. 25, 2025).

<sup>9</sup> David Wood, *Digital Rights Management*, EBU Technical Review, No. 309 (July 2006), [https://tech.ebu.ch/docs/techreview/trev\\_309-digital\\_rights.pdf](https://tech.ebu.ch/docs/techreview/trev_309-digital_rights.pdf) (last visited Sept. 25, 2025).

After considerable number of years, there was a stride in the rise of MP3 peer-to-peer file sharing networks, mainly Napster, Kazaa, and LimeWire, to name a few. Established in 1999, Napster was notorious for allowing free sharing of songs between users. Its operations were disrupted in 2001 as a result of ongoing lawsuits and finally, it filed for bankruptcy in the year of 2002.<sup>10</sup> Kazaa was also an illegal file-sharing network that was used for illegal activities like malware sharing distribution, sharing illegal downloads and contraband sharing.<sup>11</sup> It is a prime example of being an offshore P2P network, i.e., its origin has not been in the place where it was predominantly used, which is, the United States of America (USA) and many other countries. Hence, being an offshore network, it was hard to take legal action against it because it wasn't fully subject to the laws of various other countries. It was officially shut down in the August of 2012.<sup>12</sup>

Another instance seen was of LimeWire. Like its above-mentioned contemporaries, it was a large and free P2P file sharing network. Many record companies faced multitude of losses due to the sharing of free music on LimeWire. In 2010, a “federal court in New York” issued a “permanent injunction against it”, as a result of the “massive copyright infringement” caused by its operations.<sup>13</sup>

The pivot of digital piracy then shifted to torrents and streaming piracy.

The establishment of the BitTorrent protocol, in 2001, for the distribution of files on the internet through P2P networks, revolutionized digital piracy.<sup>14</sup> Unlike Napster, which was centralised, torrents were de-centralized which made to restrict them, a challenge. Numerous torrents like The Pirate Bay, Kickass Torrents and Demonoid, became largely popular.

Streaming piracy, perhaps the most common today, came into the picture due to the advent of faster internet speed. People started preferring downloading movies from illegal sites and extracting audio and video from YouTube, on illegal sites, which is a classic example of steam-ripping. India has lost Rs. 22,400 crores due to piracy on illegal streaming sites and downloading movies on unlawful sites.

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<sup>10</sup> **Lauren Feiner**, “Napster Bought for \$207 Million,” *CNBC* (25 Mar. 2025).

<sup>11</sup> “Kazaa,” ScienceDirect Topics, Computer Science, ScienceDirect, <https://www.sciencedirect.com/topics/computer-science/kazaa> (last visited Sept. 29, 2025).

<sup>12</sup> Seagrump Smith, *From Napster to Kazaa: The Battle Over Peer-to-Peer Filesharing Goes International*, *Duke L. & Tech. Rev.*, 2003, at 1.

<sup>13</sup> Josh Halliday, *LimeWire shut down by federal court*, *The Guardian* (Oct. 27, 2010), <https://www.theguardian.com/technology/2010/oct/27/limewire-shut-down>.

<sup>14</sup> Samiran Chakrawertti, *Napster dead, here comes Torrent*, *Times of India* (July 22, 2005), <https://timesofindia.indiatimes.com/napster-dead-here-comes-torrent/articleshow/1179610.cms>.

## Legal Frameworks Around the World

There are many legal frameworks, nationally and internationally, which prohibit the practices of digital piracy and virtual counterfeiting.

It includes the TRIPS Agreement.<sup>15</sup> Part III of the agreement specifies the provisions required “for the enforcement of intellectual property rights.” Articles 41-43 require the administrative, judicial and civil procedures to be enforced in a fair and in a manner in accordance with a reasonable time period, which gives right-holders and infringers the appropriate process to take recourse to.<sup>16</sup> Articles 44-46 empower the judicial authorities to issue injunctions “to prevent infringements of intellectual property rights”, “to prevent the entry of imported infringed material in the market even with a clear signal from the customs”, to remove and destroy infringed goods or services and to award damages in case of violations.<sup>17</sup> Articles 47-49 necessitate the transmission of information about the distributors taking part in the distribution of the infringed material, protection against the misuse of proceedings against the defendant, and states the equitable administrative procedures required.<sup>18</sup> Article 50 states and allows provisional measures, which includes giving immediate and urgent relief without giving a prior notice which is necessary to prevent infringement in such interim situations.<sup>19</sup> Articles 51-60 specify the border measures, which include the suspension of the release of goods which have infringing trademarks and copyright, on request of the right holders. Members may extend these provisions to other intellectual property rights. Goods that are found to be infringed, can be destroyed or removed from commercial markets, though such procedures must not cause abuse and protect the interests of legitimate trade.<sup>20</sup> Article 61 talks about the criminal procedures to be enforced. It states that Members must enforce criminal penalties, which includes the punishments of imprisonment and fines, for the offences of “wilful trademark counterfeiting” and “engaging in copyright piracy for commercial purposes.” “Remedies”, include seizure, forfeiture and disruption of infringed goods.<sup>21</sup>

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<sup>15</sup> **World Trade Organization**, *TRIPS Agreement* (15 Apr. 1994).

<sup>16</sup> TRIPS, *supra* note 14, arts. 41-43.

<sup>17</sup> TRIPS, *supra* note 14, arts. 44-46.

<sup>18</sup> TRIPS, *supra* note 14, arts. 47-49.

<sup>19</sup> TRIPS, *supra* note 14, art. 50.

<sup>20</sup> TRIPS, *supra* note 14, arts. 51-60.

<sup>21</sup> TRIPS, *supra* note 14, art. 61.

In 1998, “Digital Millennium Copyright Act” was passed for responding to the methods used by people to use copyrighted works in the late 1990s.<sup>22</sup> It was also to update the US copyright laws to adjust it to the upcoming digital age. It added various landmark provisions which were necessary at that time and have a significant impact even today. It implemented two 1996 “World Intellectual Property Organisation (WIPO) treaties”: “WIPO Copyright Treaty (WCT)” and “WIPO Performances and Phonograms Treaty (WPPT).”<sup>23</sup>

But to implement the treaties wasn’t the sole purpose. There were many key provisions added in this legislation. 17 USC 1201 listed the anti-circumvention provisions which stated that the copyright owners had to secure exclusive DRM to protect their work from being infringed.<sup>24</sup> By making this a mandate, it was a crucial step in ensuring the protection and preventing the existence of encroachment and tampering of their intellectual property rights.

17 U.S. Code Section 512 was also an important provision included which stated the limitations and restrictions which related to materials online.<sup>25</sup> It provides for the creation of a unique notice-and-takedown system. This system allows the copyright right-holder” to issue a notice to their online service provider” in case their work is being infringed, "to remove or disable access to the infringed material.”<sup>26</sup>

The limitations were known as safe-harbours. The safe harbours provide protect the online service providers from any monetary liability due to the actions of copyright infringement of their users. It provides them strong incentives and benefits to cooperate for detecting and finding out copyright infringements in digital frameworks.<sup>27</sup> DMCA further specified a counter-notice procedure to be filed in response to a valid takedown of an infringing website owner. This is an essential procedure to ensure that the authorities do not wrongly disrupt the platforms without any legally binding reason.<sup>28</sup> Various civil and criminal remedies are granted in this legislation which includes fines in the range of \$500,000 to \$1,000,000 and imprisonment time periods ranging from five to ten years.<sup>29</sup>

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<sup>22</sup> **Stephen Wolfson**, “DMCA in a New Phase,” Penn Libraries (9 Dec. 2024).

<sup>23</sup> **Digital Millennium Copyright Act**, § 512.

<sup>24</sup> Wolfson, *supra* note 21.

<sup>25</sup> DMCA § 512 *supra* note 22.

<sup>26</sup> DMCA § 512 *supra* note 22.

<sup>27</sup> Kristian Stout & Geoffrey A. Manne, *A Roadmap to Reform Section 512 of the Copyright Act*, INT’L CTR. FOR LAW & ECON. (Oct. 13, 2022), <https://laweconcenter.org/wp-content/uploads/2022/11/A-Roadmap-to-Reform-Section-512-of-the-Copyright-Act-.pdf>.

<sup>28</sup> DMCA.com, What is a DMCA Counter Notice?, <https://www.dmca.com/FAQ/What-is-a-DMCA-Counter-Notice> (last visited Sept. 29, 2025).

<sup>29</sup> DMCA § 512 *supra* note 22.

To illustrate the applicability of the DMCA, there were several important landmark precedents set in the U.S. judicial system. Some notable ones include: *A&M Records Inc. v. Napster, Inc.* (2001). In this case, the Ninth Circuit ruled that file sharing of copyrighted work through P2P networks through the help of a platform called Napster is not legal and does not amount to fair use, and it is also illegal to do it for a commercial purpose.<sup>30</sup>

In *MGM Studios, Inc. v. Grokster, Ltd.* (2005), the Supreme Court held that if a company distributes infringed copyrighted material, with the intent to promote it, then it should be held responsible for the acts of infringement committed by its third parties.<sup>31</sup>

Another one named “*Viacom Int’l, Inc. v. YouTube, Inc.*”, initially “District Court” held that the “defendants were entitled to safe harbour protections” as they didn’t have any sufficient notice of the particular infringements in the suit.<sup>32</sup> The Second Circuit reversed certain parts of the judgement but upheld the entitlement of safe harbour provisions. Thus, in a summary judgement granted by the District Court, on considering the remand from the Second Circuit Court of Appeals, it was held that YouTube didn’t have the “right and ability to control” activity that infringes for the purpose mentioned in “Section 512(c)(1)(B)”, it didn’t have the knowledge of specific infringements of Viacom’s content mentioned in the suit, nor was it escaping liability by being wilfully blind to such specific infringements.<sup>33</sup>

“WIPO Internet Treaties of 1996” which include the “WCT and WPPT.” WCT dealt with the protection of the works of copyright right holders in the contemporary digital environment.<sup>34</sup> WPPT deals with the intellectual property rights of two parties: performers which include artists like actors, singers, musicians, *inter alia* and producers of phonograms (record entities or individuals who produce or fix recorded sounds).<sup>35</sup>

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<sup>30</sup> *A&M Records, Inc. v. Napster, Inc.*, 239 F.3d 1004 (9th Cir. 2001).

<sup>31</sup> *MGM Studios, Inc. v. Grokster, Ltd.*, 545 U.S. 913 (2005).

<sup>32</sup> *Viacom Int’l, Inc. v. YouTube, Inc.*, 718 F. Supp. 2d 514 (S.D.N.Y. 2010).

<sup>33</sup> *Viacom Int’l, Inc. v. YouTube, Inc.*, 676 F.3d 19 (2d Cir. 2012).

<sup>34</sup> World Intellectual Property Organization, *Summary of the WIPO Copyright Treaty (WCT)*, [https://www.wipo.int/treaties/en/ip/wct/summary\\_wct.html](https://www.wipo.int/treaties/en/ip/wct/summary_wct.html) (last visited Sept. 29, 2025).

<sup>35</sup> World Intellectual Property Organization, *WIPO Performances and Phonograms Treaty (WPPT)*, Dec. 20, 1996, <https://www.wipo.int/treaties/en/ip/wppt/>.

## Indian Legal Framework

“The Copyright Act, 1957”, “regulates copyright protection of intellectual property goods”, in India. It covers original literary and dramatic works, musicals, artistic works, photographs, cinematography works and computer-generated “literary, dramatic, musical or artistic work.”<sup>36</sup> Section 14 defines the meaning of Copyright and states the exclusive rights given as per each author.<sup>37</sup> For literary, dramatic or musical work, they have the rights to reproduce the work, issue copies, perform, adapt, translate and “to make any cinematograph film or sound in relation of the work.” For computer programs they have the right to sell and rent any copy. For artistic works they have the right to store, depict a 2D work or a 3D work, to communicate to the public, to include the work in cinematography and to create an adaptation. For cinematograph film they have the right to make a copy, sell or rent it and communicate it to the public. For a sound recording they have the right to make any other one which embodies it, rent or sell it and communicate to the public.

Section 51 states the situations when copyright is considered to be infringed. If a person other than a copyright owner does a certain act under Section 14 which is done without a license or permission, or if someone sells, distributes or imports infringing copyrighted material for commercial purposes, or if a person who knowingly gives access to his place like a hall, cinema, or even an online platform to allow for displaying, playing, or communicating a copyrighted work to the public, it amounts to copyright infringement and the person who gave person is guilty of such infringement unless he didn’t reasonably believe such situation would happen.<sup>38</sup>

Section 65A deals with the prevention of violation of technological measures. It specifies various processes which deal with Digital Rights Management (DRM) which include encryption. To violate this section, embarks a criminal punishment “of imprisonment up to two years and also a fine.” But there is an exception that if the circumvention of such provisions is done for legitimate purposes in the eyes of law, i.e., in the interests of national security, research or interoperability, then it is valid.<sup>39</sup>

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<sup>36</sup> Copyright Act, No. 14 of 1957, § 14 (India).

<sup>37</sup> Copyright Act, *supra* note 35, § 14.

<sup>38</sup> Copyright Act, No. 14 of 1957, § 51 (India).

<sup>39</sup> Copyright Act, No. 14 of 1957, § 65A (India).

Section 65B protects the Rights Management Information (RMI). If a person alters the information to hide any traces of piracy or distributes the copies without permission, is punished up to two years of imprisonment and a fine.<sup>40</sup>

Sections 55 to 58 protect the various intellectual property rights of right-owners. Section 55 gives copyright owners to resort to civil remedies like injunctions, damages and delivery of infringing copies of their works.<sup>41</sup> Section 56 provides for right-holders to have the ability to enforce their own rights independently and it protects this ability.<sup>42</sup> Section 57 grants the authors ethical rights like paternity and integrity along with their other rights which protect their copyrighted work.<sup>43</sup> Section 58 allows action against those people who knowingly have the infringed copies for transacting commercial purposes.<sup>44</sup>

Sections 63 to 70 define the criminal penalties to be imposed on the violation of the provisions enshrined in the Act.<sup>45</sup>

Due to the advent of internet and digital technology, the Information Technology Act, 2000 (IT Act, 2000),<sup>46</sup> and IT Rules of 2021 were released.<sup>47</sup> Section 79 of the IT Act, protects online intermediaries like YouTube for user-posted content if they follow the due-diligence rules.<sup>48</sup> IT Rules, 2021, provide for a provision for the intermediary to remove infringed content within thirty-six hours from receiving the receipt of the court order.<sup>49</sup>

There were many judicial developments which arose for implementing such provisions.

Firstly, it was *Super Cassettes v. Myspace* (2017), in which Myspace sought protection “under Section 79 of the IT Act, 2000”, which provided a “safe-harbour for online intermediaries.” The Delhi High Court held that it cannot seek protection under Section 79 because it modified, monetized not on the basis of content, and curated infringing user uploads. Hence, Myspace was held liable for copyright infringement.<sup>50</sup>

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<sup>40</sup> Copyright Act, No. 14 of 1957, § 65B (India).

<sup>41</sup> Copyright Act, No. 14 of 1957, § 55 (India).

<sup>42</sup> Copyright Act, No. 14 of 1957, § 56 (India).

<sup>43</sup> Copyright Act, No. 14 of 1957, § 57 (India).

<sup>44</sup> Copyright Act, No. 14 of 1957, § 58 (India).

<sup>45</sup> Copyright Act, No. 14 of 1957, §§ 63–70 (India).

<sup>46</sup> Information Technology Act, No. 21 of 2000 (India).

<sup>47</sup> Information Technology (Intermediary Guidelines and Digital Media Ethics Code) Rules, 2021 (India).

<sup>48</sup> Information Technology Act, No. 21 of 2000, § 79 (India).

<sup>49</sup> Information Technology (Intermediary Guidelines and Digital Media Ethics Code) Rules, 2021, r. D (India).

<sup>50</sup> *Super Cassettes Industries Ltd. v. Myspace, Inc.*, (2011) 47 PTC 25 (Del.)

In “UTV Software Communications Ltd. v. 1337X.TO”, the “Delhi High Court” used an “*ex-parte*” decision to use the concept of dynamic injunction, where it was held, that the injunction owner can use it to restrict and block the websites infringing their content, instead of taking too much of the judiciary’s time in filing separate suits one after the other.<sup>51</sup>

### Contemporary Challenges

There are various enforcement challenges of various agreements which form provisions protecting an individual’s IPR. There are challenges faced in enforcing the TRIPS Agreement, for protecting IPR. One of the main reasons is of its failure in developing strong policies and norms. They have been very underdeveloped and lack the potential level of impact as shown by the Paris and Bonne Conventions.<sup>52</sup> Some have criticized their provisions to be very ambiguous.<sup>53</sup> The high substantive policies of the TRIPS agreement argue for the entrepreneurs in developed countries and not of the developing countries.<sup>54</sup>

There is a lack of awareness among the citizens of India about IPR. Students don’t know how to file patents. In spite of various schemes and programmes launched by the government, there is still lack of awareness about an individual’s IPR and how to protect them, which is a reason that India lags behind many nations.<sup>55</sup>

In India, the Copyright Act, 1957, does not provide protection for the traditional knowledge of the Indian citizens which includes folklores and other forms of traditional media.<sup>56</sup>

It is difficult to recurringly adjust with new and everyday changes in technologies and hence, different changes in legal provisions related to those technological systems.

There are also exorbitant costs of monitoring and litigation observed in cases related to infringements and enforcing or protecting an individual’s IPR. In *Viacom Int’l, Inc. v. YouTube, Inc.*, “Google spent more than \$100 million dollars as pre-legal fees to defend itself from Viacom”, who was suing it for \$1 billion dollars.<sup>57</sup>

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<sup>51</sup> *UTV Software Communications Ltd. v. 1337X.to*, AIR ONLINE 2019 DEL 773.

<sup>52</sup> Peter K. Yu, “TRIPS and its Vulnerabilities,” *J. Intell. Prop. L.* 18:2 (2011) 479.

<sup>53</sup> J. H. Reichman, “Enforcement Under TRIPS,” *37 Va. J. Int’l L.* (1997) 336–356.

<sup>54</sup> Reichman, note above, at 340.

<sup>55</sup> Neeta Prasad, “India Trails in IPR Awareness,” *The Telegraph* (19 Jan. 2022).

<sup>56</sup> Chahat Bhatia & Rishiraj Sharma, “Copyright Protection in India Today,” *IPR Journal, MNLU Nagpur* 1 (2023) 123.

<sup>57</sup> Amir Hassanabadi, “Viacom v. YouTube and the DMCA,” *26 Berkeley Tech. L.J.* (2011) 405–440.

## Economic Impacts

Due to various violations of IPR and the existence of digital piracy and virtual counterfeiting, various monetary losses are inevitable. In 2014, \$74 billion was lost due to video-game piracy.<sup>58</sup> Software piracy accounts for \$50 billion losses, mainly from companies in Asia.<sup>59</sup> According to a report by the International Chamber of Commerce, the forecast of total value of infringed goods due to piracy and counterfeiting in 2022, was a combined \$1.90 to \$2.81 trillion. The estimated employment losses were approximately 4.2 to 5.4 million, in 2022. Hence, as a wider disastrous economic consequence, it results in loss of employment.<sup>60</sup>

It also results in a stride in consumer risks who use the products which have been infringed. There are malware and trojan risks from pirated files. It also applies to NFTs which are a target of counterfeit ones and often it's difficult to differentiate between the original and the counterfeited ones as fraudsters often create identical looking ones.<sup>61</sup>

## The Way Forward

There are various pragmatic solutions to provide a comprehensive overview of how to counter such problems.

To take into account of Delhi High Court's ruling of dynamic injunction, the other courts of India should take an inspiration from this and apply faster and efficient modes of issuing injunctions to save the court's time and to ensure that justice is granted in a timely manner. In today's age where cryptocurrency is rising its ambit in a fast pace, blockchain technology should be used effectively to detect the counterfeit NFTs and to ensure more authenticity. Rather than enforcing more stronger penalties, the existing penalties should be enforced at the grassroots level to ensure that the provisions of various international and national statutes are implemented efficiently. Not only the Government of India but also the governments of other

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<sup>58</sup> **Luke Graham**, "Can Game Piracy Be Eliminated?", *CNBC* (14 Jan. 2016)..

<sup>59</sup> Over \$50 billion lost to software piracy: Report, *The Economic Times* (May 11, 2010), <https://economictimes.indiatimes.com/tech/software/over-50-billion-lost-to-software-piracy-report/articleshow/5916715.cms>.

<sup>60</sup> International Chamber of Commerce (ICC), *The Economic Impacts of Counterfeiting and Piracy*, (2016), available at <https://iccwbo.org/wp-content/uploads/sites/3/2017/02/ICC-BASCAP-Frontier-report-2016.pdf>.

<sup>61</sup> N. Upadhyay & S. Upadhyay, *The Dark Side of Non-Fungible Tokens: Understanding Risks in the NFT Marketplace from a Fraud Triangle Perspective*, 11 *Financ. Innov.* 62 (2025), <https://doi.org/10.1186/s40854-024-00684-6>.

countries should implement various educational and awareness campaigns on the grassroots level.

The use of virtual private networks (VPNs), mirror sites and torrent technology, makes it harder to track piracy. To tackle them, blockchain technology ensures that no one can tamper with the data of the user except the user himself.<sup>62</sup> Digital watermarking helps ensure that the goods being infringed is of the right-holder and can be differentiated easily from the tampered one, as the watermark makes it easy to flag the fake one.<sup>63</sup> Authentication technology can also be used to track counterfeiting.

Covert online applications having authentication technology should be adopted to ensure multi-layered verification at every step, which will prohibit virtual counterfeiting and digital piracy. This will also provide protection to the right-holder's website and the Internet Service Provider.<sup>64</sup>

Like stated in DMCA, DRM should be made mandatory to be gained by right-holders, in Indian legislations.

## **Conclusion**

Protecting creative and original creations and establishments is essential. They foster societal development and in today's virtual world where digital piracy and virtual counterfeiting prevail, strong legal frameworks to be implemented at grassroots level should be established. There should be a balance between protection and accessibility. Protecting IPR should come along with the use of technological advancements like DRM and anti-piracy tools. There should be a strong international collaboration to protect IPR globally, to establish an environment where creativity fosters virtually unlike piracy and counterfeiting.

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<sup>62</sup> **Anthony et al.**, "Anti-Counterfeit Blockchain System," 216 *Procedia Computer Sci.* (2023) 86.

<sup>63</sup> ScienceDirect, *Watermarking*, <https://www.sciencedirect.com/topics/computer-science/watermarking> (last visited Sept. 29, 2025).

<sup>64</sup> Ian M. Lancaster, *The Role of Authentication Technologies in Combating Counterfeiting*, WIPO Magazine (Apr. 14, 2006), <https://www.wipo.int/web/wipo-magazine/articles/the-role-of-authentication-technologies-in-combating-counterfeiting-35166>.