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Copyright Infringement in the Digital Age: Challenges and Solutions

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ABSTRACT

In the fast-paced world of digital technology, the internet, and online platforms, copyright infringement has become one of the most critical factors in the digital age. For example, copying, distribution, and easy access have all complicated the enforcement of copyright laws. Unauthorized uses of creative works have spread over the world and are now very common. The problem becomes bigger and thornier as consumer peer-to-peer networks, streaming companies, and social networking sites proliferate, leaving creators of original content and rights holders confused about how to protect works and how to earn revenues through their intellectual property.

This paper discusses how copyright infringement raises a variety of challenges in digital age, travel beyond the global nature of the internet to private jurisdictional issues and strike a balance between the rights accorded to creators for their protection and further accessing information by the public. New technologies such as blockchain, artificial intelligence, and digital watermarking will also be dealt with in addressing such problems. Further, the paper evaluates the DMCA and related international treaties, such as the Berne Convention, as considerable efforts worldwide to strike a balance between countering infringement and considering implications on fair use and user rights.

There is a need to raise public awareness about copyright law and develop collaborative measures by stakeholders, as well as the use of technology to enhance effectiveness in applying copyright law. It concludes that multiple approaches - including legal, technological, and educational strategies - should be brought together in order to address copyright infringement while enabling innovation and creativity in the digital age.

Keywords: *Copyright infringement, digital piracy, intellectual property, fair use, content sharing, copyright enforcement, digital rights management.*

I. INTRODUCTION

The digital age has transformed the methods used to create, distribute, and consume cultural content in an increasingly globalized environment. The internet, social media, streaming services, and peer-to-peer networks have ushered in a golden age for artistic creations and their worldwide dissemination. However, this digital transformation has further aggravated

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the risks of copyright infringement. Digital technology has simplified making copies, offering them for download, and distributing copies, thus making copyright law enforcement exceedingly laborious on the part of content creators and copyright holders. Hence, copyright infringement in the digital realm is now a pressing concern at an international scale, which calls for a full-fledged response on the bases of law, technology, and policy.

Copyright infringement means the exploitation or reproduction or distribution of protected content without authorization or consent from the copyright owner. Copyright infringement involves such violations in the digital world and illegal downloading and online streaming piracies, reproducing copyrighted material on social media, unauthorized usage of photographs, music, movies, and software. In online contexts, copyright infringements are unlike physical ones: they are of an unprecedented magnitude and in most situations exceed the jurisdictional reach of any given nation or state, hence making prosecutions difficult.

One of the most pressing matters with digital infringement is how fast and easy it is to copy and share contents. Instead, P2P networks, torrent sites, and file-sharing platforms permit users to distribute copyrighted material anywhere in the world anonymously, where it becomes virtually impossible for rights holders to track and prosecute offenders. Furthermore, the use of Virtual Private Networks (VPNs) and anonymizing tools has become rampant, enabling users to hide their identity from law enforcement - further hampering enforcement action.

The other major challenge is the ineffectiveness of existing copyright law to cope with the dynamic nature of digital piracy. Copyrights have, in any case, had their roots in an era where physical capture and transportation were the legitimate means of the trade and transferring goods. Traditional copyright laws have a hard time dealing with such an oddity in digital terrains. Also, some very interesting jurisdictional issues arise since copyright infringement usually precedes the constitution of several countries, hence creating disjoints in their copyright legislation and enforcement. For instance, a website hosting pirated content may be situated in a jurisdiction with feeble copyright enforcement policies, hence rendering rights holder's incapable of taking action. However, even if the DMCA and such laws from other jurisdictions as well give some level of protection to intermediaries, they also lie under the takedown obligations stipulated therein. The justification for the takedown measures is an area of contention, since it is virtually impossible to quantify the extent to which they remain efficacious, given the volume of content that gets uploaded every day.

This requires a trifecta of technological, legal-forum-based as well as policy-based solutions.

Technological solutions such as digital rights management, content identification algorithms, and watermarking for detecting or preventing infringements further strengthen the need to strengthen intermediary liability, harmonization of international copyright laws, and improvement of enforcement mechanisms. Public awareness campaigns on responsible consumption of digital products and respect for intellectual property rights can also prove useful in this respect.

II. COPYRIGHT

Copyright is an important intellectual property right under TRIPS, the Agreement of Trade Related Intellectual Property Rights, which came into effect in 1995. The phrase Copier of words was the first one to describe the meaning copyright in the Oxford English Dictionary. Usage is in the context of original creation in arts, literature and dramatic works. Although this scope is now not limited to these, with the advent of computer and artificial intelligence, copyright has come up to recognize computer codes, programs and languages.²

The Copyright Act, 1957 governs "copyright" in India; now the Copyright (Amendment) Act, 2012. Section 14 of the Act states that copyright means exclusive rights that are given to the owner of the original creation, referred to within the Act to reproduce, publish, broadcast, sell, rent and distribute his work. It is a legal right provided to protect the rights of all types of intellectual or creative works, such as literary work, sound and music recordings, photographs, drama and movie production/recording work, other artistic works, sculpture, manuscripts, software, and computer programs/codes and videos, graphic arts, produced either offline or even online in this internet age but not through artificial intelligence. Copyright consists of various rights and is called a bundle of rights.

As defined under Section 2(ffc) of the Copyright Act (Amendment) Act, 1999, a computer programme shall mean a set of instructions expressed in words, codes, schemes or in any other form, including machine readable medium, which can cause a computer to perform a particular task or achieve a particular result.

As per Section 2(o) of this Act, "literary work" includes computer programmes, tables and compilations including computer databases.

The current Information Technology Act, 2000 also governs the laws concerning cybercrimes, tempering of data and a vast range of information technology, including digital signatures and digital locker. Section 2(0) of this Act defines "data" as any information, fact, process,

² Copyright Infringement in the digital age, available at: <https://blog.ipleaders.in/copyright-infringement-in-the-digital-age>(last visited March 20,2025)

knowledge, or instruction fed in the computer system to make it usable in the best way for the person arranging it.

Data can have meaning for a user if it is stored in the form of tables or worksheets or graphs or collections of records, and since such data could belong to any company, person, or government, it deserves privacy protection and is also susceptible to piracy.

Both Berne Convention 1971 and TRIPS 1995 raised the need for copyright protection for computer programmes, including software, codes and digital things related to the Internet.³

In India, there is no specific provision under which databases are protected, as it makes it even more difficult to determine originality and genuineness of the database, as it is otherwise included under the computer programme head in the Copyrights Act. But it is copyright protected by the Digital Millennium Copyright Act in the USA while the legal protection for databases in Europe is by the European Commission Directive.

This is the 21st century, in which the world has very quickly moved from the industrial setup of the Industrial Revolution to technologically centred economies reliant on digital platforms. It is, therefore, more appropriate to refer to it as the Digital and Information Age rather than just the Digital Age.

III. COPYRIGHT INFRINGEMENT

Infringement basically defines a condition where an individual illegally reproduces, broadcasts or displays for use the creative works of another person devoid of any authority from the copyright holder.⁴

Exemplary case of copyright infringement illustrates that a web programmer develops code that forms a part of off-job research work for recent literary works and then, by way of absence, that's frustrated, and the code was pirated from his laptop. The same code was used, word for word, and published by his employer's company as part of a game in that application owned by the company. The employer partook in copyright infringement with the programmer, who is the rightful owner of the copyright to that code.

An example of something that is not copyright infringement: An employee at a software development house has made copies of the latest software to be held in the company's vault in case the server undergoes any technical glitches and this software, the employee will not be

³ Copyright Infringement in the digital age, available at: <https://blog.ipleaders.in/copyright-infringement-in-the-digital-age>(last visited March 20,2025)

⁴ Copyright Infringement: Meaning, Examples, Cases in India, available at: <https://cleartax.in/s/copyright-infringement>(last visited March 20,2025)

infringing copyright because the company's internal regulations require the authorized personnel to make copies of the software the company has produced. These copies are to ensure the continued availability of the exercise should the company's server fail for any reason.

Sections 51 and 52 of the Copyright Act, 1957 speak about copyright infringement. Section 51 of the Act describes what works of copyright infringe. Section 52 gives a long and elaborate list of acts, which do not amount to infringing copyrights.

With the age of the internet roaring fast, copying and stealing other people's work is very easy, exceedingly cheap and with no impairment to original quality. This has brought great difficulty to the lives of most content creators in dealing with the modus operandi adopted to deal with the illegal downloads of pirated forms of movies, e-books, music, games, databases and so forth. It has brought immense financial loss along with a waste of effort on elaborate research and development by the original holders of the content, alongside the boosting of unethical practices for easy money.

People are getting their intellectual property efforts infringed in the fast-paced internet age. In fact, costs might be a very low quality, and these would compare quite well with the original quality. For instance, it has made very great difficulties for most content writers on how they could deal with the ways of illegal downloads of piracy in the pirated forms of movies, e-books, music, games, databases, and so on. For the right holders of the original content, it brings huge losses in money and wastage of efforts on elaborate research and development, and unethical practices are multiplying for easy money.

IV. CONVENTIONS AND TREATIES IN THE WORLD

It was considered essential to have a regulation at an international level when duplication and piracy in broadcasting as well as unauthorized public presentation arose. This prompted many international conventions and treaties dealing with copyright issues.

Berne Convention

The Bern Convention is the name given for the meeting that took place in Bern, Switzerland, in 1886, attended by ten European countries to discuss some form of relief for their original literary works by authors and art works by artists. In fact, this was the first time copyrights were referred to as author rights and make rights. Countries that are members of this treaty can protect their authors'/content-creators copyrights from infringements in all member countries. India is a member since 1928, and the Indian Copyright Act, 1957 offers limited

regulations in accordance with the provisions of the Berne Convention.⁵

Functions of WIPO (World Intellectual Property Organisation)

57 years ago, in 1967, an internal branch of the United Nations-that of its specialised and self-funding agency came into existence from Geneva, Switzerland, thus comprising 193 member states. The very motto behind the formation of WIPO was to protect and promote knowledge of intellectual property all over the globe.⁶ This whole event would happen under the auspices of WIPO meetings where discussions would centre on the new developments in this field, provision of member country protection and other international organisations, circulation of statistics and data collected worldwide, harmonisation of laws and uniform adoption with regard to IPR by members, and present forum for showcasing the latest research papers on policies and regulations. It well provides a dispute redressal system for the members. India joined WIPO, with 16 treaties of those 26 treaties that WIPO administers, in 1975.

TRIPS (Trade-Related Aspects of Intellectual Property Rights)

Because of a multilateral framework absence, principles and rules regarding international trade and protection of the Intellectual Property Rights (IPR) of the trading community worldwide, the Agreement on Trade Related Aspects of Intellectual Property Rights (TRIPS), including Trade in Counterfeit Goods, takes birth under the roof of WTO, which took place as a convention of 164 parties in Marrakesh, Morocco, in 1994⁷. Yet, it continues to be one of the most coherent jammed and most significant treaties on IPR in the world. It covers almost all dimensions of the IPR but focuses mostly on the copyright rights. Member states must comply with the provisions laid down by the agreement, closely.

WCT & WPPT

It has been a work in progress where WIPO strives endlessly to maintain existing standards and push forward new regulations in the increasingly advancing cyberspace where maintaining the copyright has proved to be a hard nut to crack. These two new treaties-the WIPO Copyright Treaty (WCT)⁸ and the WIPO Phonogram and Performance Treaty (WPPT)-were unveiled to the world in a big way. The treaties have been nicknamed 'Internet' treaties since their key concern is to provide some form of remedy from piracy, duplicating, and rights

⁵ Copyright And Leading Treaties of Copyright, available at: <https://www.legalserviceindia.com/legal/article-5951-copyright-and-leading-treaties-of-copyright.html>(last visited March 20,2025)

⁶ Copyright Infringement in the digital age, available at: <https://blog.ipleaders.in/copyright-infringement-in-the-digital-age/>(last visited March 20,2025)

⁷ Copyright And Leading Treaties of Copyright, available at: <https://www.legalserviceindia.com/legal/article-5951-copyright-and-leading-treaties-of-copyright.html>(last visited March 20,2025)

⁸ WIPO Copyright Treaty (WCT), available at: <https://www.wipo.int/treaties/en/ip/wct/>(last visited March 20,2025)

in the hands of the owners within a digital territory.

WCT speaks into detail about the protection accorded to original works in literature, the arts in general, music, the fine arts, and photography and treats with emphasis writing computer programs and databases. It puts forward some special provisions that no other existing treaty would provide concerning rights under this ever-changing and always advancing field-information technology. It particularly protects coders.

WPPT states how issues are to be settled involving musicians, singers, actors, etc. who perform offline or online. Recording producers using phonograms face the same problem-the copying of their signs, symbols, or vocal sounds together with musical notes. In truth, WPPT⁹ enjoys association with a select bunch of people; however, due to continuous advancements in technology, work from the performance side would also be subject to illegal reproduction without authorities.

India entered into the agreement with WCT and WPPT only quite late-in 2018-to realize much later that the country needed strict laws governing all aspects of IPR in general and copyright, in particular, in an age of rapid transformation. And, indeed, while much relief is offered in law dealing with copyright in India if it is for educational purposes.

V. INDIA'S EFFORTS TO PROTECT DIGITAL COPYRIGHTS

Unlike in Europe and America, the awareness of the copyright needs was felt much later in India. The first law, which came nearest to a finished shape, was the Copyright Act, 1957. Much was left to be confused and mistakes as it bore much more of the confusing type. But as and when progressed the advancing age to the world's evolution with respect to copyrights and its digital advancement, India too proceeded in that domain hand in hand along with international law.¹⁰

There were many amendments, few of those are: the amendment act of 1994, for the specific introduction of protection to computer software and broadcasting & telecasting advanced communications media; amendment act of 1999, which is in line with TRIPs Agreement with respect to illegal and unauthorized exploitation to offer due protection of the original creation of creators, and copyright amendment act of 2012, to harmonize with the "Internet" treaties of the WIPO, to be adopted such that the provisions of fair use of digital media and technology

⁹ Aligning with the WPPT: Proposed Amendments to the Copyright Act for Strengthening Copyright Protection available at: [https://www.lexology.com/library/detail.\(last visited March 20,2025\)](https://www.lexology.com/library/detail.(last+visited+March+20,2025))

¹⁰ Protection of Digital Content in relation to Copyright Law in India, available at: [https://www.iiprd.com/protection-of-digital-content-in-relation-to-copyright-law-in-india/\(last visited March 20,2025\)](https://www.iiprd.com/protection-of-digital-content-in-relation-to-copyright-law-in-india/(last+visited+March+20,2025))

are ensured.

Copyright Amendment Act, 2012 is the principal statute concerning copyright law in India. Nevertheless, it is not the only law that has provision for copyright issues. There are also the Information Technology Act, 2000, and the Indian Penal Code with their provisions concerning copyright law.

The Information Technology Act, 2000

"Information Technology Act" of 2000, or the IT-like comprehensive law, governs all such wide range of issues with respect to information technology including cybercrime.¹¹

- Section 66A: Provides for an offence of communicating an offensive or defamatory message by electronic means. This provision has resulted in many prosecutions of individuals for placing on their websites unauthorized copies of works protected by copyright.
- Section 66B: This section makes it a crime to receive or possess pirated digital content. This is designed to ensure that individuals do not download or share unauthorized copies of copyrighted works.
- Section 66C: Elements of crime related to Digital Content entitled 'Sedition or Tampering with or Removal of Copyright Protection Notice from Digital Content.' This provision aims to protect the rights of copyright owners and illegal dissemination of copyrighted works.

Indian Penal Code

Every crime in a particular sense is covered by the Indian Penal Code (IPC), including cybercrime. The IPC has various provisions relevant to copyright law.¹²

- Section 420: This section empowers to make it an offence to cheat or deceive someone; this provision was used to prosecute a person for selling pirated copies of copyrighted works.
- Section 465: This section states that it would be an offence to forge or counterfeit a document. It has been invoked to prosecute for making unauthorized copies of copyrighted works.

¹¹ Copyright Infringement in the digital age, available at: <https://blog.ipleaders.in/copyright-infringement-in-the-digital-age>(last visited March 20,2025)

¹² Criminal Liabilities and Remedies for Copyright Infringement in India, available at: <https://blog.ipleaders.in/criminal-liabilities-remedies-copyright-infringement-india/>(last visited March 20,2025)

- Section 471: This prohibits the possession of stolen property. It has been used for prosecuting those who have been found in possession of pirated copies of copyrighted works.

Such specific types of cybercrime like hacking, copyright infringement, and piracy are elaborately mentioned in the 2000 Information Technology Act.

The Digital Millennium Copyright Act of the USA provides legal guidelines for complaints regarding cybercrimes to be instituted by internet service providers.¹³ India has also incorporated parts of it into her laws for greater strictness in the administration of the protection of digital content creators.

The Copyright Division of the Department of Education under the Ministry of HRD issued the Copyright Rules in 2013. The new rules included licensing and registration procedures, storage of copies, and protection against infringement for literary and musical works, performers, and software developers. These rules were amended in 2016 and again in 2021. The Copyright (Amendment) Rules of 2021 introduce more transparency and accountability in terms of cyber security so that with digital advancement, all ministries are now digitally occupied, and all government reports and data are made available online. With respect to copyrights, such as the collection of fees charged for licensing and registration, distribution of royalties, collection of fines, etc., everything is done electronically as an enhancement of these rules.

VI. IMPACT OF DIGITALIZATION IN INFRINGING COPYRIGHTS

Piracy-Merely put, piracy is the illegal reproduction and distribution of copyright-protected material such as computer software and games, books, music, and movies, thereby infringing the rights of the authors, performers, artists, and other creators of the copyrighted work. Piracy of software works by the unauthorized use of copyrighted software.¹⁴ Copying, downloading, and selling of software without permission could all be considered piratical acts. Using software without the consent of the copyright owner for purposes of personal consumption and for commercial purposes, making copies of software, and sharing warez are all forms of software piracy that use computer technologies.

Linking- Linking is a way in which a user of a website visits another through a hyperlink

¹³ Copyright Infringement in the digital age, available at: <https://blog.ipleaders.in/copyright-infringement-in-the-digital-age>(last visited March 20,2025)

¹⁴ Digitalization And Copyright Law, available at: <https://www.ipandlegalfilings.com/digitalization-and-copyright-law/>(last visited March 20,2025)

which has been shared on the website. Linking sometimes leads to infringing upon the rights of the owner of the linked page. It can create a presumption that both the linked sites are the same and therefore diminish the importance of the linked site. There is a landmark case on hyperlinking and copyright infringement, *Ticketmaster Corporation V. Microsoft Corporation*. The case was brought by Ticketmaster against Microsoft alleging deep linking to the Ticketmaster Website without authorization. It was held that deep linking did not infringe any copyrights as there was no direct copying.

Social media- Entering from a very large platform, social media is now widely embraced and extensively used, finding its application from connecting people worldwide. Copyright violations started to arise from this popular tendency of sharing content on social media platforms: images, videos, photographs, write-ups, etc. It is a commonly held notion that whatever is uploaded on the social media platform belongs to the open domain. However, this is not so, and any unauthorized sharing of such content prepares a way for breach of copyright. Copyrighted content should not be stored, reposted, or shared.

Fair Use Doctrine and Anti-Circumvention Laws- Section 52 of the Copyright Act deals with the concept of fair use, which allows for the use of parts of copyrighted material without the owner's permission. Treatment that is fair, in any manner, includes commonsense, like consideration of study of, comment on, or testing of that work or any other work, covering current trends and market events, that includes publication of a speech or foreseeing the decree... Anti-Circumvention Laws protect the copyright owners vigorously by giving them exclusive rights upon their work for some time, excluding the public from any access to it. Anti-Circumvention laws have not been enforced in India, however.

VII. CHALLENGES OF COPYRIGHT IN THE DIGITAL ERA

The digital world poses many challenges for copyright enforcement, with the geographic reach of the Internet being the major obstacle. Copyrights are typically limited to the purview of certain states or jurisdictions, while the Internet facilitates the sharing and accessing of content across international borders.¹⁵ As such, rights enforcement becomes very difficult, especially when the infringing materials are being hosted nearby countries with weaker or very minimal enforcement of copyright laws.

Jurisdictional issues

Determining which country has jurisdiction over online copyright infringement is extremely

¹⁵ Copyright Infringement in digital era, available at: <https://blog.ipleaders.in/copyright-digital-era/> (last visited March 22, 2025)

complex. For example, if a website in Country A has pirated a movie, it can potentially be accessed in other countries as well. Therefore, when it involves animals in litigation, it involves several nations' laws, which takes up judicial time and costs a lot.

Ease of digital reproduction and distribution

The very nature of digital content makes it even more vulnerable to abuse. Digital files like music, movies, and books can be copied and distributed with utmost ease and little exertion as they have little to no physical existence. The rapid proliferation of advanced mechanisms to evade copyrights has made digital piracy a growing concern since unauthorized copies of original works are being done and shared through limitless digital mediums without much concern.

Digital piracy

The unauthorized reproduction and dissemination of copyrighted material have become a major issue. Online anonymity and the use of sophisticated techniques to avoid detection continue to hinder enforcement.

Technological development and copyright law

Technology is moving fast, even faster than the lay of the land. Innovations such as AI, blockchain, and NFTs are therefore bringing new complexities to copyright, given that existing laws are not set up to address them.¹⁶

AI-generated content

AI is creating an original song, an artwork, or a book, which could bring forth debate about the copyright ownership of such results. In essence, traditional copyright laws that cater for human authors are thus being shadowed by the dynamic presence of AI, creating a gray area.

NFTs and digital ownership:

NFTs make it possible for creators to demonstrate ownership of digital content, including art and music; however, it is challenging to verify that authenticity and enforce copyrights of the original creators in decentralized marketplaces. Even if one owns the NFT, that does not mean permission was given to copy the underlying content.

Challenges from online platforms:

Social media and other content-sharing platforms, such as YouTube, Instagram, and TikTok, have offered novel avenues of copyright infringement. Users easily upload, share, and remix

¹⁶ Copyright Issues in the Digital Era: Challenges and Solutions, available at: <https://lawctopus.com/clatalogue/clat-pg/copyright-issues-in-digital-era/> (last visited March 20, 2025)

content, often in total disregard of copyright protection.

VIII. DIGITAL COPYRIGHT ANALYSIS IN INDIA

The Copyright Act of 1957 has made some evolutionary changes to turn more contemporary in response to the distinctive challenges that emerged during the digital era.¹⁷ At the heart of the copyright paradigm specified to support intellectual property rights of the creators, this continued and dynamic regime was constantly kept in tune with an environment increasingly characterized by digital content creation, dissemination, and consumption.

The Copyright (Amendment) Act of 2012 is perhaps the most crucial update to the copyright protection regime in India. This Act brought about the change in the digital paradigm and aligned Indian copyright law with Treaties such as the World Copyright Treaty of 1996 and the WIPO Performance and Phonogram Treaty of 1996, thus bringing under the protection of acts the fast-expanding domain of digital works that copyright law had not previously considered.

The Copyright (Amendment) Act, 2012, provided for the elaboration of provisions to solve the varying challenges posed by the electronic environment. Such provisions include penalties to prevent copyright infringement, especially in the digital sector.

Further, the amendment tackled the complexities of management information rights: the responsibilities and liabilities of the internet service providers in preventing copyright infringement on their platforms.

To enable creative work and innovation, the amendment also introduced statutory licenses for such activities as cover versions and broadcasting, thus balancing the interests of creators and public access to content.

Consequent upon this developmental chain, Indian courts have claimed an equally crucial role in formulating digital copyright. The landmark case of *UTV Software Communication Ltd v/s 1337x and others* is one such manifestation. The court upholds the concept that online infringement of copyright is tantamount to physical infringement, thereby reiterating that the digital domain does not enjoy immunity from copyright protection.

The viewpoint from the courts reaffirms the need to balance between securing the rights of creators and ensuring an open and accessible cyberspace. It stresses the need for stipulating a clear demarcation for the usage and enforcement of digital content in the very particular

¹⁷ Protection of Digital Content in relation to Copyright Law in India, available at: <https://www.iiprd.com/protection-of-digital-content-in-relation-to-copyright-law-in-india/> (last visited March 20, 2025)

Indian context.

IX. DIGITAL SOLUTIONS FOR COPYRIGHT INFRINGEMENT

The copyright infringement in the digital age has become a nuisance. It has led to the content creator, business, and industry suffering significant losses due to unauthorized use and distribution of copyrighted works. The free flow of digital rights management, peer-to-peer (P2P) networks, and social media provide conduits for infringers to copy and disseminate copyrighted materials. Enforcing copyright on the Internet becomes even more cumbersome since it does embrace a truly global and borderline jurisdictional character. A set of logical solutions should be implemented to tackle such growing challenges: this set should embrace technological responsiveness, legal enforcement, and policy intervention¹⁸.

1. Solutions in Technology

Technological advancement helps in preventing copyright infringement by introducing different strategies to make it hard for the infringer to reproduce or diffuse the protected content. Today several technologies exist for detecting and curtailing infringing actions.

a) Digital rights management

Digital rights management is one of the most popular technologies to defeat unauthorized access and copying of digital content. The DRM system uses encryption, licensing, and access control to define how the user can access and share copyrighted material. Contents of streaming platforms such as Netflix and Amazon Prime are DRM-protected so that access to the content is restricted to authorized subscribers, while screen recording or duplication of content is rendered impossible. Criticism is directed towards making it hackable, while committed infringers often succeed in subverting it.

b) Watermarking and digital fingerprinting

Watermarking means discreetly or visibly identifying marker traces into digital content (e.g., images, videos, or documents) for identifying the original creator or rights holder.¹⁹ This could help track down the source of the infringement if the content is shared without the creator's consent. In contrast, digital fingerprinting is the process of recognizing copyrighted content through unique identification, such as, in the case of YouTube and Facebook. The

¹⁸Copyright Protection in the Digital Age: Combating Online Piracy, available at: <https://jpassociates.co.in/copyright-protection-in-the-digital-age-combating-online-piracy/> (last visited March 20,2025)

¹⁹ Watermarking/Fingerprinting for Copyright Protection, available at: https://www.researchgate.net/publication/n/224647234_On_WatermarkingFingerprinting_for_Copyright_Protection (last visited March 20,2025)

content ID systems used by YouTube automatically detect and flag unauthorized uploads of copyright material, and rights holders can either monetarily claim the content or have it taken down.

c) Automated Content Recognition (ACR) and Filtering

Most online platforms apply automated content recognition systems to identify and take down infringing content.²⁰ The technology recognizes video, image, or music content to facilitate copyright identification. Facebook and Instagram use algorithms for filtering out content that creates awareness of infringing posts so that they can automatically flag and remove them. System views are clearly effective; sometimes, however, they tend to be overly rigorous and inappropriately delete valid content.

2. Legal Redress

Robust legal frameworks are necessary for combating copyright infringement in the digital age.²¹ This is especially considering that digital content flows beyond the borders. It follows that the tightening and harmonization of global copyright laws, increasing intermediary liability, and then stricter penalties could act as strong deterrents.

a) Enhanced Liability of Intermediaries

Intermediary platforms such as YouTube, Facebook, and TikTok host vast amounts of user-generated content. Strengthening their liabilities for copyright violation is critical. The Digital Millennium Copyright Act (DMCA) in the U.S. and Section 79 of the Indian IT Act, 2000 stipulate certain safe harbours to intermediaries. However, these platforms are required to take down infringing content upon receiving a valid complaint. Increasing their accountability dramatically can deter the hosting of pirated content through more stringent takedown policies and greater penalties.

b) Cross-Border Enforcement and Treaties

Most of the time, digital infringement arises from various jurisdictions. Therefore, it is appropriate for such offenses to have international cooperation.²² The World Intellectual Property Organization (WIPO) Copyright Treaty (WCT) and Trade-Related Aspects of Intellectual Property Rights (TRIPS) treaties among others, set minimum standards related to

²⁰ Automatic Content Recognition (ACR) Technologies: A Copyright Management Tool for Content-Sharing Platforms, available at: <https://academic.oup.com/> (last visited March 20, 2025)

²¹ Digital Copyright Infringement: Challenges and Solutions in the Digital Age, available at: <https://www.etblaw.com/digital-copyright-infringement-challenges-and-solutions/> (last visited March 20, 2025)

²² Cross-Border Copyright Protection: Challenges & Solutions, available at: https://www.scoredetect.com/blog/posts/cross-border-copyright-protection-challenges-and-solutions#google_vignette (last visited March 20, 2025)

copyright protection. The enforcement across borders, fast extradition of offenders, and uniformity of penalties will thus strengthen the fight against piracy globally.

c) Expansion of Fair Use and Licensing Frameworks

In some cases, expansion of fair-use provisions and the introduction of flexible licensing might reduce infringement. For example, an easy and affordable licensing mode can be put in place for an individual or small business by content creators, which will reduce piracy motivations. For example, platforms like Creative Commons are flexible copyright licenses through which content creators can permit some limited use of their work without fully restricting it and thus encouraging legal sharing of content.

3. Policy and Regulatory Interventions

Governments and regulators have a big role to play in curbing digital copyright infringement by formulating strict policies, implementing penalties, and educating the public.²³

a) Strong Enforcements and Deterrent Action

Dissuading large-scale infringement of copyright with strict penalties can include provisions of very heavy fines and imprisonment. Governments may also set up particular cybercrime units to monitor and investigate digital piracy networks. In India, Section 63 of the Copyright Act, 1957, made infringement punishable with a term of imprisonment for a maximum period of three years, along with a fine; however, the enforcement remains very poor. Strengthening legal enforcement through the creation of special task forces would enhance protection against piracy activities.

b) Mandatory Copyright Education and Public Awareness

In educating people about the copyright laws, public awareness campaigns are very essential. Such campaigns should be combined with concerted efforts with both government and private content creators on the importance of intellectual property and the consequences of infringement.²⁴ The dissemination of information through social media, schools, and universities will help develop a culture of copyright respect.

c) Site Blocking and Takedown Orders

Judicial and administrative authorities can order blocking of websites that are hosting infringing contents. In various countries, the courts routinely pronounce Dynamic Injunctions

²³ Copyright Infringement: Definition, Meaning, Example, and Criteria, available at: <https://www.investopedia.com/terms/c/copyright-infringement.asp>(last visited March 20,2025)

²⁴ Awareness on Copyright among Students, available at: https://www.researchgate.net/publication/344151791_Awareness_on_Copyright_among_Students(last visited March 20,2025)

to block access to notorious piracy websites. Rampant piracy websites in India have been issued blocking orders by the Delhi High Court. Such dynamic injunctions can also be adopted in other jurisdictions to restrict access to illegal content.

4. Collaborative Industry Initiatives

Collaboration among content creators, digital platforms, and enforcement bodies is essential in any fight against digital copyright infringements.

a) Industry Coalitions and Agreements

The industry has formed its own coalitions to carry on the battle against the online piracy scourge. For instance, the Alliance for Creativity and Entertainment (ACE), which consists of several of the biggest Hollywood studios and streaming services, has been taking legal action against piracy networks.²⁵ Partnerships of industry leaders with law enforcement and government entities could enhance efforts to protect copyright.

b) Voluntary Codes of Conduct

Digital platforms and ISPs should adopt voluntary codes of conduct to deny access to infringing content. ISPs should warn or limit access to users who repeatedly engage in illegal downloading or streaming through cooperation with copyright holders.

5. Balancing Copyright Protection and Consumer Rights

This is another area where infringements are important to fight, but an equally important consideration is to maintain a balance between copyright protection and consumer safeguards. Overzealous enforcement can obstruct legitimate content sharing and innovation. Copyright should be enforced in such a way as to encourage creativity but not stifle innovation and legitimate use.

X. CASE LAWS

1. *Google LLC v. Oracle Am., Inc.*²⁶

Facts

In *Google LLC v. Oracle Am., Inc.*, Oracle America had a monopoly right on the Java Standard Edition platform, a computer program that finds ample use in the programming community. Google would copy a little more than 11,500 lines of declaring code from Java

²⁵ Copyright issues related to the entertainment industry, available at: <https://lawbhoomi.com/copyright-issues-related-to-the-entertainment-industry/> (last visited March 20, 2025)

²⁶ 141 S. Ct. 1183 (2021)

Standard Edition for the purpose of developing its mobile device platform, Android, to attract programmers trained in Java, without permission. Google first entered negotiations with Oracle for some form of licensing of Java 2 but was unable to come to an acceptable arrangement. Oracle then sued Google in alleging copyright infringement, and the case went up to the Federal Circuit, which ruled in favor of Oracle, holding that the code was copyrightable, and that Google's use was not fair use. The case found its way to the U.S. Supreme Court, which presumed that the code was copyrightable and simply sought to determine whether Google's use was fair. The Supreme Court later would reverse the Federal Circuit's decision, holding that Google's use of the declaring code was in fact a fair use and remanding the case for further proceedings in accordance with its decision.

Decision

The U.S. Supreme Court considered the nature of the declaring code to be functional and user-oriented and therefore farther from the heartland of copyright protection. The Court noted that Google's use was transformative because it created a new platform for a different computing environment and thus promoted creativity and innovation. The Court weighed in on the substantiality of the portion in question: while it concluded a large number of lines were copied, they were required to enable programmers to use their existing skill set in a new platform. The Court also weighed the effect in this market, concluding copying did not adversely affect Oracle's potential markets because Oracle was not in a good position to compete in the smartphone market. The decision thus served to weigh the need to protect the copyrighted work against the social utility of allowing this copying to spur further technological development.

***2. Super Cassettes Industries Ltd. v. Myspace Inc. (2011)*²⁷**

Facts

Super Cassettes Industries Ltd., also known as T-Series, is an active participant in the Indian music business and has acquired a wide collection of music subject to copyright. Citizens using the worldwide social networking site, MySpace, can create profiles, post information, and share multimedia, including music and videos. Super Cassettes discovered that a plethora of unauthorized postings of its copyrighted music were being uploaded and exchanged on MySpace without due permission. Hence, it instituted a case against MySpace, claiming that it had promoted copyright violations and profited therefrom. The Super Cassettes alleged that MySpace's policy of letting users post and distribute multimedia naturally encouraged public

²⁷ CS(OS) No. 2682/2008

infringement of copyright. Super Cassettes also contended that it suffered great financial suffering and dilution of its intellectual property rights due to MySpace's failure in not blocking the uploading and distribution of information that blatantly violated copyright.

Decision

The Delhi High Court, upholding Super Cassettes' argument, held that MySpace had failed to put in place adequate measures to prevent the continuous infringement of the copyrighted works of Super Cassettes. Therefore, MySpace would be liable for the copyright infringement and could not claim protection under Section 79. The judgments pointed towards the fact that there is an obligation on intermediaries to ensure active monitoring and control of their content. In fact, this encompasses the implementation of measures to prevent and rely on illegal content uploads, effective responses to notifications of infringement, and appropriate handling of repeat offenders.

3. Burlington Home Shopping Pvt. Ltd. vs. Rajnish Chibber & Anr. (1995)²⁸

Facts

This case concerned Burlington Home Shopping Pvt. Ltd. (the plaintiff), a company selling direct-to-home products; and Rajnish Chibber & Anr. (the defendants), a cable operator. The plaintiff claimed that the defendants were retransmitting its programmes without its authority, thus resulting in copyright infringement.

Decision

The Court of Delhi held that the defendants had retransmitted the programmes of the plaintiff without his authorization, which constituted copyright infringement. The court observed that the acts of the defendants amounted to making a copy of the plaintiff's programmes while retransmitting these and not having a license from the plaintiff for the same. The court also ruled that plaintiff would be entitled to injunctions forbidding the defendants from further retransmitting its programmes, damages, and account of profits made by such retransmission.

4. The Chancellor, Master and Scholars of The University of Oxford & Ors. vs. Rameshwari Photocopying Services & Anr. (2016)²⁹

Facts

What's at issue in this case is a quarrel between the university of oxford-the plaintiff-and

²⁸ 1995 PTC (15) 278

²⁹ (2016) 16 DRJ (SN) 678

Rameshwari Photocopying Services-another-defendant representing a photocopying shop. The plaintiff contended that these defendants photocopied their copyrighted material without authorization, and they have been distributing what they term pencils as copies of the works of the plaintiff.

Decision

The Delhi High Court affirmed that the act of photocopying the copyrighted materials of the plaintiff by the defendants did indeed amount to copyright infringement. The judgment got published while stipulating that the defendants photocopied the plaintiff's copyrighted materials but granted that these defendants never had a license from the plaintiff for this. The court also ruled that the plaintiff deserved injunctions against the defendants from continuing to photocopy its copyrighted materials, damages, and an account of the profits that defendants gained photocopying its copyrighted materials.

XI. CONCLUSION

The digital age has entirely transformed the way people create, share, and consume content. New paradigms have created unique spaces for creativity to flourish and be shared across the globe; however, there has also been an unprecedented peak in copyright infringement that has never occurred with the use of technology. Reproduction and distribution of digital content have become very easy, making it tough for copyright holders to protect their intellectual property (IP) rights. Enforcement actions are very complex and often difficult because infringers can operate in multiple jurisdictions with their disparate legal frameworks, given the borderless nature of cyberspace.

Addressing the menace of copyright infringement in the digital environment needs a holistic and synergistic approach: a combination of technology solutions, legal remedies, and policy considerations. Under this technology, which is both a friend and enemy to humans, it opened wonderful avenues for detection and prevention. DRM systems, content filtering, as well as watermarking and automated content recognition (ACR) systems are now essential in the identification and removal of unauthorized content. Systems such as that of YouTube or Facebook flag infringing material through their provided content identification systems, and watermarking techniques help trace the source of unauthorized use. It must be mentioned that through technology, deterrence is ensured, but resources must continuously churn out more innovative means of deterrence since most are easy to circumvent by even the most determined infringers.

Legal frameworks are necessary in dealing with digital copyright infringement, but most

current copyright laws erect barriers to dealing effectively with online piracy, as they were designed for use with the physical content only. Such steps will include bolstering intermediary liability, stiffening penalties, and harmonizing international copyright rules. These include existing treaties such as the WIPO Copyright Treaty (WCT) and the TRIPS Agreement which have established some framework for global cooperation, but they still lag in many aspects especially in effective cross-border enforcement of piracy networks.

Polyvalent policy intervention and public awareness are equally necessary. Governments will need to run tough anti-piracy policies, dynamic injunctions against rogue websites, and have cybercrime units dedicated to investigating and prosecuting networks infringing at high levels. In addition, consumers can be educated on the economic and ethical consequences of piracy, which would promote conscious digital consumption. Such campaigns, bringing to light the impact of piracy on the lives of content creators, could easily affect the decision of many users in opting for legal alternatives.

Collaboration from all industries will be yet another essential factor in dealing with digital copyright infringement. Content creators, streaming platforms, and internet service providers (ISPs) will have to come together in a way where they form industry coalitions and voluntary codes of conduct. Such joint efforts, as that of the Alliance for Creativity and Entertainment (ACE), are evidence of the ability of collaboration in creating foundations for dismantling large-scale piracy operations.

Therefore, while there are needed efficient protection strategies that entrench copyrights, enforcement should also fit into the consumer rights and principles of fair use. Anti-copyright infringement measure strands may be too strict sometimes and may hamper legitimate sharing and innovation.
