

ISSN: 2583-8725

Lex Scripta Journal

Quarterly Online and Print Edition

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**LEX SCRIPTA MAGAZINE OF
LAW AND POLICY (VOL-4, ISSUE-1)**

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ISSN-2583-8725

Vol - IV, Issue - I

Published by INTEGRITY EDUCATION INDIA

New Delhi

First Floor, 4598/12-B, 1st Floor,
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Phone: +91 98 11 66 62 16 (Vineet Sharma)

Printed in India @ New Delhi

ISSN: 2583-8725

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Copyright Protection of Computer Software and Databases in India: Issues and Challenges

Author
Jaspreet Kaur



Copyright Protection of Computer Software and Databases in India: Issues and Challenges

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Abstract

The fast growth of the digital economy has placed computer software and databases on an elevated position of an important intellectual property, which consequently has led to a need to protect it through the judicial system. The copyright law in India forms the major mechanism used to control the protection of such digital works. This paper discusses whether the coverage and sufficiency of copyright protection granted to computer software and databases by the Copyright Act, 1957 is adequate and in line with the technological developments and commercial changes. It examines the statutory framework, international commitments and judicial interpretations which form the protection regime in India. The paper also determines major problems and pitfalls, such as application of originality criterion, the concept of idea and expression dichotomy, and difficulties in enforcement and the lack of sui generis of protection of databases. Through critical analysis of these issues, the paper is able to discuss whether the current legal framework is striking the right equilibrium between incentivising innovation and creating access, and the paper recommends specific legal and policy changes.

Introduction

The fast growth of information technology essentially changed the channels of knowledge creation, storage and dissemination. Computer software and databases have become essential elements of modern-day economic life that promote innovation in a wide range of spheres that include finance, healthcare, education, governance, and e-commerce¹. The way the digital economy operates in the present-day world is that software applications and data-driven systems are not mere technical tools anymore; these represent valuable intellectual property that requires stringent legal protection. As a

¹ IP, Phone Home: The Uneasy Relationship between Copyright and Privacy in the Digital Age", 2 International Journal of Law and Information Technology 30 (2014).

result, intellectual law has taken a centre stage in the regulation of rights to such digital creations, especially the copyright law².

Copyright, which is a law designed to protect literary and artistic works has been applied to computer software and databases by categorizing them as literary works. The protection under India is largely regulated by the Copyright Act, 1957 which expressly includes computer programmes under the umbrella of copyrightable subject matter. Databases are not clearly defined, but they are protected as collections as long as they meet the necessary standard of originality. This jurisprudential tendency represents an attempt to adjust the traditional copyright principles to the works that are technologically advanced and functionally oriented.

However, there are a number of conceptual and practical challenges that are faced in the application of copyright law to the protection of software and databases. Computer software is also functional, unlike conventional literary works, which obscures the distinction between the idea and the expression. Similarly, databases create questions about the protectability of unselected facts, data and information as the copyright is not over unselected information or data; it is over the initial selection/arrangement of information. Certain aspects of originality, the extent of exclusive rights, and infringement identification obtain a new dimension in the digital environment, where copying and spreading might happen immediately and cross-jurisdictional borders.

The obligations of India by the international instruments like the Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS) and the WIPO Copyright Treaty also influence the domestic legislation system in India, and there should be a compromise between the international standards and national developmental needs. Simultaneously, the lack of sui generis regime of database protection practiced in some jurisdictions (like in the European Union) poses some challenges with the suitability of the protection of database creators in the Indian context.

It is on this background that this paper will critically analyze the copyright protection on computer software and databases in India. It will examine the legal provisions in the statute, judicial interpretations and the policy aspects that guide this area of legal practice and will also establish the significant issues and challenges that are facing both right holders and users. The

² V.K. Ahuja, "Intellectual Property Rights in the Digital Era: Emerging Trends and Challenges", *14 Journal of Intellectual Property Rights* 310 (2009).

research also considers the suitability of the current legal system to balance the goals of enhancing innovation, avoiding monopolisation of information, and the provision of access to the mass in the rapidly changing technological environment.

Conceptual Framework: Copyright and Digital Works

Copyright is a legal monopolistic right given to authors by law in order to control the specific use of their original literary, dramatic, musical, and artistic works. The economic right of copyright is mainly to stimulate the creation, made available to authors to allow them to commercialise their works (e.g., by giving the author the moral credit or integrity). Other rights, such as the right to attribution and integrity, support the non-economic rights of the author (as a moral right). The protection is a content-focused one, i.e. copyright protects the expressions of ideas and not ideas. This difference, the dichotomy of idea and expression, is a restriction at the core that is aimed to stop the monopolisation of information and to retain the freedom of thought and further creativity³.

These rights of personality usually include reproduction, distribution, adapting, performance in the public and communication to the masses. As a result, the legal examination of infringement is focused on determining whether an alleged action takes a significant portion of the expression which is protectable rather than simply using unprotectable ideas, facts, methods or processes.

Computer Software Copyrightable subject matter.

The modern copyright laws treat the computer program as literary work. This type of treatment is based on the belief that source code and object code are fixed and reflect the decisions of the author and have the right to protection. The textual character of the source code makes it similar to traditional literary expression, and object code, though machine-readable, is considered as an expression in translation of the same. Despite this assimilation, software has unique doctrinal issues. Software by virtue of its functionality nature is a tool with operational commands, algorithms and interface endowed⁴. Therefore, conceptually it is not easy to make a distinction between protectable and unprotectable expression: the specific

³ N.S. Gopalakrishnan, "The Idea-Expression Dichotomy in Copyright Law: A Critique", *I Journal of Intellectual Property Studies* 89 (2017).

⁴ Pamela Samuelson, "Functionality and Expression in Computer Programs: Refining the Tests for Software Copyright Infringement", *31 Berkeley Technology Law Journal* 1215 (2016).

structure, sequence, and organization of code, comments, documentation, and user-interface elements versus the functional elements per se (algorithms per se, programming languages, and ideas or methods of operation). The courts and commentators thus use modified tests that emphasize the need to determine whether the purported copied material is an original expression of choice, not a functional efficiency or standardisation.

The problem of ownership and authorship is also acute in the circles of software development where various contributors, commissioned texts, open-source communities, and collaborative development confuse the customary concept of authorship. The rights are thus managed through contractual assignment of rights, presumptions between the employer and the employee and licensing systems.

Databases and Copyright Protection.

Databases are a set of data, facts or any other materials that are organized or structured. Copyright law does not protect pure facts or data, only the original choice or organization of such materials by the author is subject to protection. In this way the form of the compilation, that is, its structure, its taxonomy, its headings, its indexing, its editorial decisions, is protectable, on condition that these are not of a nature to show insufficient skill and judgment.

With this treatment, a stratified legal status has been created: the individual facts are not subject to privatization, whereas the database, as a collection, can be guarded against the unauthorized retrieval or reproduction of a significant portion of it. However, the level of protection depends on the originality threshold that is applied. Where originality is evaluated in a very limited way (it needs only a small amount of creative work), even databases with relatively little effort on the part of the curator will qualify; where the test is more stringent, only truly creative collections will do so. The conceptual framework presented herein justifies the further analysis of statutory, judicial provisions, as well as policy tensions that emerge when traditional copyright principles are implemented to software and databases in a digital economy.

International Legal Framework on Software and Database Protection

The protection of computer software and databases under the copyright legislation has been significantly affected by the international legal tools, particularly the response to the globalisation of the business and the rapid development of digital technologies. Seeing that digital works easily traverse the national boundaries, the internationalisation of the copyright standards has become inevitable to ensure that a certain level of fair minimum of protection is guaranteed whilst allowing the states to enjoy a certain level of discretion in their legislative process⁵. Therefore, the Indian legal framework on the protection of software and databases is relatively consistent with the Indian multilateral treaty obligations.

The Geneva Convention on the protection of literary and artistic works is the constitutive tool of international copyright law. The Convention, though actualised much earlier than the invention of computers, has a technologically neutral approach in that it applies protection to a literary and artistic work, whether it is represented in writing or any other medium. This latitude allowed the member states to categorize the computer software as a literary piece. The Convention enshrines the fundamental principles, such as national treatment, protection without the need of formalities and the low standards of rights, such as reproduction and adaptation. Although computer programs and databases are not mentioned specifically, its general structure helped them get incorporated in the domestic copyright regimes in the future.

Greater acknowledgment in the form of a more binding understanding of software and databases saw the light of day with the Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS). Being a contract administered by the World Trade Organization, TRIPS made the protection of intellectual property a trade requirement and thus made it binding to the member countries. TRIPS article 10(1) clearly stipulates that computer programs, regardless of being in source or object code, are to be protected as literary works under the copyright law⁶. This is also a provision that eliminates any ambiguity and makes sure that software is given a standardized minimum protection across jurisdictions. Article 10(2) provides safeguarding to collections of data or other information in either

⁵ Mira Sundara Rajan, "Moral Rights in the Digital Age: New Possibilities for the Democratization of Culture", *16 International Review of Intellectual Property and Competition Law* 18 (2012).

⁶ Jayashree Watal, "Intellectual Property Rights in the WTO and Developing Countries", *12 European Journal of International Law* 405 (2001).

machine-readable or other forms as long as the compilation of information is an intellectual creation due to the choice or organization of its contents. At the same time, TRIPS makes it clear that the copyright is not applied to the underlying data or material, therefore, does not affect the fact- or information-public-domain status of information.

The WTO Copyright Treaty (WCT) also updated copyright legislation to solve the difficulties posed by digital technologies. The WCT restated that computer software was a safeguarded literary work and it was also protected to data-banks that are eligible as an intellectual creation. One of the major contributions of the WCT is that it pays attention to the technological neutrality as well as the acknowledgement of the digital world, especially concerning electronic dissemination and electronic reproduction. New requirements are also presented throughout the treaty that are related to technological protection measures and rights-management information, which are aimed at resisting the digital piracy and unauthorised access in the online environment.

Other than multilateral treaties, comparative international practice can also provide insights on other options of database protection. The European Union has established a *sui generis* database right⁷, a right that protects a significant investment on obtaining of, or verification or presentation of database contents regardless of originality. This process recognizes the economic worth of databases other than traditional copyright principles. Unlike this, the US is almost entirely dependent on the law of copyright, where a relatively higher level of originality is required and therefore databases can only receive a relatively low level of protection unless they are of a creative choice or organization.

In general, the international legal framework gives the minimum standards to the protection of software and databases allowing national differences. The copyright law in India mostly reflects these requirements especially in the TRIPS and the WCT. However, differences in meaning, implementation and policy decisions still follow the effectiveness of protection even in the domestic level.

⁷ Mark J. Davison, "The Legal Protection of Databases", 52 Cambridge Law Journal 11 (2003).

Copyright Protection of Computer Software in India

Copyright Act, 1957 is the conceptual statutory mechanism of computer software protection in the Indian law. The Act uses a technology-neutral classificatory schema, subsuming the computer programmes under the cover of the literary works: the definition of the computer programmes in the statute states that a computer programme is a set of instructions which are expressed in words, codes, schemes or in any other form, including a machine-readable form, and can result in a computer performing a certain task or being able to achieve a certain result⁸. Such a legal stance imposes canonic outlines of copyright protection, reproduction, adaptation, communication to the public and other rights of exclusivity onto the sphere of software.

The rights bestowed statutorily on the owner of a computer programme are mainly similar to the rights granted to authors of other literary works and statutory provision that reflects the commercial aspect of software such as the ability to sell or commercially rent copies of computer programmes. The Act also acknowledges some realisable exceptions specific to software: in particular, the legitimate possessor of a copy is allowed to make copies or adaptations of a computer programme of a copy, a provision that has a significant practical implication of lawful backup, maintenance and compatibility undertakings⁹. The statutory scheme thus endeavors to harmonize the exclusive economic rights of the authors and proprietors with user limited freedom that is required to make use of it and to be compatible with technology.

The scope of protection is regulated by two doctrine thresholds: originality and idea-expression dichotomy. The Indian courts have time and again stated that copyright safeguards the expression and not the idea, method or functional principle. This doctrine was first expressed by the Supreme Court in a case in which it was called *R.G. Anand v. And Deluxe Films** is still a reference point: they have to be similar in the articulation and not in subject matter or in broad concepts. A more modern case concerning the originality test in the application of the Act was the case of *Eastern Book Company v. D.B. Modak*, in which the Supreme Court identified that the compilation or editorial work itself could be a subject of protection as long as the work of the author of the compilation or editing has contributed to an original

⁸ Zakir Thomas, "Overview of Changes to the Indian Copyright Law", *17 Journal of Intellectual Property Rights* 324 (2012).

⁹ Prashant Reddy and Sumathi Chandrashekar, *Create, Copy, Disrupt: India's Intellectual Property Battlegrounds* (Oxford University Press, New Delhi, 2017).

expression of work. These principles are used in applying software disputes to make a distinction between protectable and unprotectable software between protectable source and object code, structure, sequence, organisation and feature of the user-interface and unprotectable ideas, algorithms, structural constraints, and functional constraints¹⁰.

The peculiarities of software development have been forced to be faced in judicial treatment of software. Courts and practitioners make a distinction between various degrees of software infringement: literal copying of source code is the simplest infringement; object code, which encompasses copying object code, can also be infringed upon; more subtle claims include non-literal elements such as program structure, sequence and organisation (SSO), user interfaces and design architectures¹¹. In theory, Indian courts have been open to the identification of non-literal copying in which the plaintiff happens to prove that the supposedly copied elements constitute original expressive decisions, and not simply efficient or commonplace solutions or programming. Meanwhile, Indian jurisprudence is sensitive to the fact that copyright is not to be permitted to monopolize ideas, algorithms, programming languages or modes of operation, which remain areas of the conventional jurisdiction of patent law, but with its own drawbacks.

The problem of authorship and ownership becomes practically tricky in the case of software. Contemporary software is sometimes the result of a collaborative team, a contractor or open-source community; it is typical to have a group of different contributors, employers and licensors of the software. The default provisions of the Act on authorship and employer-employee presumptions are conditional on contract: ownerships in commercial practice are regularly ascertained by employment contracts, commissions and assignments. This means that careful work-for-hire clauses, assignment and licence terms must be drafted in cases where the client wants to have clear title and exploitable rights. Proprietary licensing, shrink-wrap and click-wrap licensing, and open-source licences have emerged as the major process of rights allocation and exploitation in the software market¹².

¹⁰ Indu Gupta, "Copyright Protection for Computer Software: An Indian Perspective", *11 Journal of Intellectual Property Rights* 200 (2006).

¹¹ Raman Mittal, "Look and Feel of Computer Programs: The Evolution of the Idea-Expression Dichotomy", *50 Journal of the Indian Law Institute* 185 (2008).

¹² Andres Guadamuz, "The License/Contract Dichotomy in Open Source Licenses", *2 University of La Verne Law Review* 101 (2009).

Indian law enforcement and remedies combine civil and criminal penalties. The owner of a copyright may claim injunctions, damages or account profits in civil proceedings; and criminal law (such as imprisonment and fines in Section 63 and analogous clauses), provides criminal redress in the event of knowingly committing infringement and piracy. Other procedural measures against digital piracy include search, seizure and preservation orders are also found in the Indian law. But enforcement has practical challenges: copying (particularly non-literal copying) is difficult to prove, interim injunction is difficult to obtain quickly in fast-paced digital markets, electronic evidence is hard to find, and cross-border infringement remains a challenge to rights owners.

There are special problems due to interoperability, reverse-engineering and open-source distribution. The statutory exception that authorises lawful possessions to copy or adapt might be applied to allow intermediate steps that are required to make interoperability or maintain its legality, but its domain is fact-dependent and contentious. Open-source software is both a threat and an addition to copyright since, through the conditions of the licence (usually permissive or copyleft), the open-source ecosystems are using copyright to promote widespread reuse over exclusivity - a trend that is increasingly finding traction in India by commercial interests and the courts.

Overall, the copyright system in India grants explicit and substantial protection to computer software by incorporating programmes into the literary works, however the practical consequences of such protection are determined by the boundaries of the doctrine (originality, idea-expression), contractual practice and remedies. The Indian law can give the tools to safeguard the code and some compilatory and structural features, but the existing doctrinal and practical tensions, especially that connected to the functional aspects of software, interoperability and cross-jurisdictional enforcement, emphasize the necessity to approach the interpretation of the statutory words carefully, to make sure the contractual arrangements are strong, and the enforcement strategies are practical and effective.

Copyright Protection of Databases in India

Databases play a central role in the digital economy in the process of organising, storing and facilitating quick access to facts and information. The Indian copyright law does not recognize databases as a different category of intellectual property but instead, databases are safeguarded as collections or literary works wherein the necessary element of originality is

fulfilled. This legal and dogmatic stance has a superimposed effect of protection; individual facts or raw data will be in the open, whereas the compiler of the database has the right to copyright in the selectable, competitive or packaging of such data¹³. The outcome provides a helpful shield to editorial and curatorial work, although there are significant omissions, most notably the lack of a sui generis database right equivalent to that in Europe, which has practical implications on industries involving heavy investment in databases, and enforcement in the online context.

Statutory Position and Judicial Approach

The Copyright Act, 1957 does not provide a definition of database on its own, but the definition of literary work in the Copyright Act and the idea of compilations incorporates protection of database in case of demonstration of originality. Copyright automatically exists in qualifying compilations and grants to the rights-holder the standard range of exclusive rights (reproduction, distribution, adaptation and communication to the public). Meanwhile, the principle that the copyright law does not protect facts or ideas as such, but only protects the original mode of their choice or organization, is retained by the Act.

The originality as the sine qua non of protectability has been stressed in Indian jurisprudence. The case of *Eastern Book Company v. D.B. Modak* of the Supreme Court is the most authoritative case on works of compilation: the Court considered that originality in the context of Section 13 should be interpreted in terms of effort, skill and judgment of the author in creating the work and protection was applicable to the expression of the editorial judgment and not to the facts¹⁴. This strategy makes India more in line with jurisdictions that place greater emphasis on the labour and craft of the compiler in the compilation, and places a boundary against monopoly of raw information.

Since the statute and case law involve proving that the selection or arrangement was initially done, all databases will not be eligible to enjoy copyright. Databases whose compilation has little or no editorial effort or mechanical combination may not meet the threshold of originality. This dogma is not only a barrier to monopolisation of information, but a handicap in practice: databases that are reliant more on expensive procurement, verification or continuing investment, but not on creative selection or

¹³ Tabrez Ahmad, "Copyright Protection of Databases in India: A Critical Analysis", 4 *Indian Journal of Law and Technology* 12 (2008).

¹⁴ T.G. Agitha, "The 'Sweat of the Brow' Doctrine in Copyright Law: An Analysis of *Eastern Book Company v. D.B. Modak*", 13 *Journal of Intellectual Property Rights* 523 (2008).

organisation, may have difficulty obtaining copyright protection in India¹⁵. The fact that sui generis right is not expressly codified implies that courts and practitioners have to use the contours of originality to safeguard databases based investment.

Practical Challenges and Enforcement

One of the main challenges of practical use to the owners of databases is establishing infringement in the electronic world. The infringement of copyright in regard to a database usually involves evidence of duplication of any significant portion of the expression to be guarded (selection, arrangement, indexing or presentation). Online markets often encounter copying (in the form of automated scraping, API access, or systematic use); it is a fact-specific and technologically complicated issue to determine whether the appropriation can be seen to be based on protectable editorial decisions and not on unprotectable facts. The rights-holders should thus provide both technical evidence (logs, metadata, forensic captures) and legal evidence of qualitative or quantitative substantiality.

Since raw data are not safeguarded by copyright per se, the owners of databases usually use contractual and technological protections as an appropriate supplement to legal protection. Creating enforceable obligations is common using licensing regimes, terms of service, click-wrap agreements, contractual prohibitions on extractions, technological protection mechanisms (TPM), access controls, and watermarking are commonly used to prevent and identify unauthorized extractions¹⁶. These mechanisms of the private law are helpful yet fall short: the rights under contract refer to the contracting parties only, and TPMs create circumvention, interoperability and consumer rights concerns.

This is a common policy issue because of the lack of a sui generis database right. In jurisdictions where sui generis regime was adopted, i.e. most prominently the European Union, there is a lot of investment in acquiring and authenticating or reporting database contents despite the absence of originality¹⁷. Proponents believe that this type of regime would better serve the model of business relying on massive data aggregation and curation. The opponents respond that sui generis rights would be subject to undue restriction to downstream usages that are factual information research and

¹⁵ The 'Modicum of Creativity' Standard in India: A Step towards Global Harmonisation?", 3 *Journal of Intellectual Property Law & Practice* 18 (2008).

¹⁶ Copyright and the Protection of Databases", 1 *Indian Journal of Law and Technology* 65 (2005).

¹⁷ Estelle Derclaye, "The Court of Justice Interprets the Database Right: A Step in the Right Direction?", 31 *European Law Review* 40 (2006).

competition. The current attitude of India, which is based on the use of copyright and the support of contract and technological means, indicates a very careful compromise, but exposes producers of databases to a condition of vulnerability in which their usefulness is based more on investment than on a creative disposition.

Implementation is further complicated: civil relief and criminal enforcement is complicated by the flows of data across borders, the complexity of jurisdiction, and the ephemerality of online copying. The Indian law has procedural remedies (search and seizure, interim injunctions, preservation of evidence), but to get a successful relief, quick technical response and forensic capacity is needed. The genuine societal uses of research, journalism and interoperability also must be faced by the courts as legitimate uses of the copyrighted material, which can justifiably be extracted in insubstantial form or restricted reuse. As a result, a number of database disputes have been settled by negotiated licence or injunctive compromise, as opposed to any definitive ruling on doctrine. Overall, the copyright protection system of India provides significant protection to databases that present original choice or organization, yet it falls short of extending protection to databases based on investment. The rights-holders thus consolidate statutory copyright with the contractual safeguards and technological measures to safeguard the value of databases, while the policymakers and the courts are still struggling to strike the right balance in balancing protection in order to promote data-driven innovation without unnecessary restrictions to access to facts and information.

Issues and Challenges in Copyright Protection

Although computer software and databases are now recognised in the statutes as copyrightable subject matter, areas of law relating to copyright of digital works in India have continued to be characterized by doctrinal and technological and enforcement-related challenges. These challenges are in large part credited to the efforts to apply to functional and data-driven creations the traditional principles of copyright that were originally meant to be applied to literary and artistic works. The weaknesses of the current legal system are becoming more and more obvious as computer programs and databases grow in both scale and legal importance.

A major issue, one of the most fundamental ones, is the use of the idea-expression dichotomy on computer software. Software is utilitarian in nature: it is programmed to do certain tasks, to run commands and resolve problems. This practical nature works to obscure the difference between unprotectable ideas, methods and processes on one hand and protectable expression on the other. Algorithms and methods of operation are not

granted any protection under the copyright law; however, deciding where the expression starts is usually a hot topic¹⁸. The protection of source code as expression can be applied, but when common functionality necessitates that programmers use a similar programming structure a claim of infringement would be conferred, which means that the alleged idea is granted de facto monopoly. The Indian courts are therefore forced to introduce the protection in a delicate manner so that the copyright does not undermine the technological advancement and competition which is so far a hugely fact-intensive and doctrinally questionable endeavor.

Along with this problem is the dilemma of coming up with the correct originality level in the online environment. The Indian copyright law stipulates originality to protect the copyright, however, the criterion has been defined in a flexible way in terms of the skill, labour and judgement of the author. This criterion is supposed to stop automatic reproduction and copying of the work but when applied to software and databases can be skewed. In computer programming originality could be in form, order, arrangement or in design of the interface, as opposed to the individual lines of code. Even where the underlying data is mundane, originality in databases can be created by editorial discretion in its choice or order. The difficulty, however, is to make certain that the originality bar is no lower than to safeguard arrangements that are trivial or inevitable, and no higher than to deter legitimate investment and originality.

The copyright protection is also problematic due to technological advances. Open-source software usage is challenging the traditional concepts of exclusivity as copyright is intentionally used to allow sharing, modification and redistribution under the provisions of a licence¹⁹. Even though the open-source models have expedited innovation, they are also posing a legal challenge in terms of the compliance with the licence obligations, attribution requirement and downstream proprietary use. Equally, cloud computing and Software-as-a-Service (SaaS) platforms are changing the traditional notions of reproduction and distribution since users usually do not obtain a copy of the software in a traditional way but access it remotely²⁰. The issue of infringement, the ownership and the territorial jurisdiction in these situations has therefore become a lot more difficult to determine.

Artificial intelligence is a novel and a challenging issue. Authorship, originality and ownership are substantive concerns when it comes to

¹⁸ Karleen O'Connor, "Copyright Protection of Software: The Idea/Expression Dichotomy", 35 Copyright Law Symposium 220 (1988).

¹⁹ Lawrence Lessig, "The Creative Commons", 65 Montana Law Review 1 (2004).

²⁰ Copyright in the Cloud", 72 Maryland Law Review 101 (2013).

software and databases that are created or edited with the help of AI systems. The copyright law is based on human creativity, but AI-enabled or AI-generated work might be associated with the slight human contribution. Indian law, so far, has not clarified to what extent and whether such outputs can be subject to copyright protection, which leaves major confusion to the developers and investors in data-driven technologies²¹.

Another important challenge is enforcement. Unauthorised copying and software piracy is also common, as it is made easy by the possibility of digital duplication and distribution via the Internet. Even though under Indian law, both civil and criminal remedies are provided, they are often impeded by practical challenges. These are troubles of infringement detection, proving copying, especially on non-literal infringement, assembling electronic evidence, and obtaining interim relief in a timely manner. Enforcements are also complicated by cross-border infringements as acts of infringement can involve users and intermediaries, as well as servers, based in more than one jurisdiction²².

The non protectability of raw data presents unique enforcement problems to databases. The web scraping, data mining, and systematic extraction activities can be economically harmful to the owners of the databases, and do not fit the customary boundaries of copyright infringement in the event that they do not steal expression that is protectable. This issue is worsened by the fact that there is no sui generis database right in India, so that creators of databases are left to rely on the doctrines of copyright that are ill-suited to the interests of investments. The measures of technological protection and contractual restrictions are partial solutions that are constrained and limited in scope and efficacy.

Lastly, stands the predicament between the rights of the holders of rights on the one hand and the protection of the interests of the people, on the other hand. The danger of over-protection is the suppression of access to information, innovation, and research and interoperability. Under-protection on the other hand can make investors shy of investing in software development and database creation. A suitable balance is especially difficult when it comes to a developing economy like India, where access to technology and information is directly related to more general socioeconomic goals.

²¹ Copyright in the Age of Artificial Intelligence", 5 Indian Journal of Law and Technology 15 (2020).

²² Arul George Scaria, "Piracy in the Indian Film Industry: Copyright Law and Cultural Practices", 10 Journal of Intellectual Property Rights 30 (2015).

Emerging Trends and Reform Perspectives

The fast development of digital technologies has brought new controversy to the sufficiency of the current copyright standards on computer programs and databases in India. New technological and business trends suggest that an entirely traditional approach to copyright might not be sufficient to deal with the complexity of the current digital content, thus requiring a legal and policy re-alignment. A major trend that has been on the rise is the interface of copyright and patent law with regard to software protection. Although the Indian law does not patent any computer programs per se, copyright and trade secret protection and contractual licensing are commonly combined in a strategic manner by those holding rights with a view to ensuring a viable control of software based innovations. Such overlapping of the intellectual property regimes highlights the necessity of establishing clearer doctrines on the use of the intellectual property rights to ensure the rights are not overprotected at the expense of innovation incentives²³.

The other important reform perspective is that of database protection. With the rise in the economic value of data-based businesses, a lack of the sui generis database right in India has been growingly conspicuous. Though the original choice and arrangement are secured by copyright rights, the significant investments in the creation of the collections, the verification and upkeep of the large databases are not sufficiently secured. Policymakers can thus ponder on the possibility of whether a restricted, more investment based sui generis regime, cautiously designed to prevent monopolisation of facts would better serve the digital economy in India. Lessons in the European Union indicate that this protection should be strictly limited and followed up by strong exceptions to research, teaching and the common good.

The legislation mandate is further emphasized by the policy programmes like Digital India and the growing attention to the issue of data governance. Authorship, originality and infringement are trite concepts in light of the development of artificial intelligence, cloud-based services and automatically processed data analytics. Further reforms might be required on AI-aided creation, cross-border information movement and platform responsibility in a more direct way. Finally, a progressive copyright system, sensitive to technological shifts and based on constitutional principles of access and creativity, is needed in order to make the legal framework in India effective and balanced in the digital age.

²³ Feroz Ali Khader, *The Law of Patents: With a Special Focus on Pharmaceuticals in India* (LexisNexis, New Delhi, 2007).

Conclusion

The discussion conducted throughout this paper has shown that copyright legislation is the main legal tool that is used in the protection of computer software and databases in India. The Copyright Act, 1957 attempts to make the classical copyright principles relevant to the current conditions of the digital economy by defining computer programmes as literary works and extending copyright protection to databases that represent original selection or arrangement. The judicial interpretation has been of great importance in figuring out this framework especially in perfecting the standards of originality as well as enhancing the concept of idea and expression dichotomy with the aim of discouraging excessive monopolisation of functional ideas and factual information. Nevertheless, the research demonstrates that there are major weaknesses in the current regime. The practicality of software, the capitalist nature of databases and the high rate of technologic change reveal a lack of doctrinal and practical assurance in the defense of copyright. The problem of enforcement, technological issues, and the lack of sui generis database right also limit the usefulness of legal solutions. Even though to some extent, these issues can be solved by contractual and technological means, they cannot replace effective and explicit statutory provisions. To sum up, though copyright laws in India offer a baseline of protection to software and databases, there is an urgent demand to promote subtle changes in the law. This kind of reform should be a delicate balance between encouraging innovation and protecting access by the masses in such a way that copyright law is responsive and fair and in a position to keep up with the changing digital and knowledge economy in India.

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