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Protection of Software Under Intellectual Property Law: Scopes and Challenges

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ABSTRACT

Software plays a pivotal role in modernizing contemporary world and without conservation of software IPR (Intellectual Property Rights), innovation in the tech industry can't be contemplated. So this paper enumerates the scopes of software IPR focusing on the diversified nature of software IPR the standard for ascertaining the exact class of software IP is which difficult to determine so this paper to clarify this issue elaborates on the essence and challenges of availing Copyright, Patent, Trade Secrets in the context of protecting the software IPR from infringement and misappropriation in the technology industry.

Keywords: *Software; Intellectual Property Rights; Copyright; Patent; Trade Secrets.*

I. INTRODUCTION

21st century and the advent of 4th industrial revolution has called for serious utilization of machine learning, artificial intelligence (AI) and automation of human affairs. Post pandemic era has seen vast influx of software programs which are being produced regularly by talented programmers and coders each day. These software engineers are backbones behind such creative innovations which are known as computer programs or software. Technology industry is an economically thriving business where software business plays a vital role. Since software business has its own benefits it begs the question that what sorts of protection mechanism are there to legitimately safeguard the software creator's right or Intellectual Property rights (IPR) of the programmers which need to be validated and adequately protected.

In the contemporary corporate world, the tech industries spend huge sums of money in the research and development of their software. So the owners and developers alike need to emphasize rigorously on the proper protection of their intellectual property. When it comes to the protection ambits of software IPs, the software developers use a complex combination of copyright, trademark, patent and trade secret laws. But the implementation of this IP protection mechanism in case of software has its own challenges. The most prominent challenge of all is the threat of unauthorized re-production or software piracy. So to suppress these challenges the software IP right holders relentlessly want to register their Intellectual asset under conventional

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protection mechanism but since software has diversified attributes and purposes, the registration of every software as distinguished IPR is rather a complex task.

This paper thus aims to clarify the obligation of the software developers and owners to obtain the Intellectual Property protections available for Software and Computer programs under national and international Intellectual Property Law practices and the subsequent challenges and predicaments the IP right holder encounters towards availing such protection in the competitive software industry.

The main purpose of this article is to examine in a non-technical way the ambiguous attributes of software as a an intellectual property and determine the class of IP to which software and computer program belongs to and finally this paper would aim to compare the present IP protection mechanism pertaining to Software and computer generated programs in light of the national and international law and would prescribe some recommendations to mitigate the challenges to secure software IP protections.

(A) Rationale and methodology

After consulting relevant literatures, this study confidently underlines the scopes and challenges of protecting software IP, to clarify the parameters of protecting software IPR which are contradictory in nature and due to this reason the availability of the conventional IPR mechanisms for software is conflicting since the software elements is complex and technical.

To solve the hypothesis of this study utilizes doctrinal method of research which relied on the qualitative data accrued from secondary and primary sources mostly.

II. SCOPES OF PROTECTING SOFTWARE IP

Software development or the process of creating software involves compiling a certain code based on conventional programming language for instance visual C or C++, Java etc. And such code is used to implement certain computer functionality. “Software” and “Computer program” being referred as synonymous to each other in this write. To illustrate software, it can be either OS (Operating System) software, Application based software intended to be used in the OS such as web browsers which serve general purpose mostly. And on the other hand specialized focused software which is designed from the ground up to address a particular computational problem for instance scientific, calculation etc. when it comes to protection schemes for software IPs there are various options a right holder in tech industry can avail. Most prominent of all are Copyright, Patent, and Trade Secret.

The categorization of software has two intrinsic technical aspects which deal with the core

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essence of the IP protection of software mostly relevant in the case of copyrighting any computer program. Firstly, an individual programmer usually uses programming language to compile a particular "Source Code" and later that code is converted into an "object code" which is used by the computer to conduct a specific function for which the source code was designed for originally. So in order to justify the copyright of software ensuring right over the aforementioned two codes plays a vital role. This paper would later highlight in brief the pros and cons of software copyrighting in the technology industry.

The second industry standard software IP protection is the certifying a software or computer program with a "Patent". Patent as a prolific mechanism for protecting IPsonly grants newer invention the status of protection. Patent holder usually for his/her new invented work is granted exclusive protection right. In case of software patenting the grant of patent to distinct software requires extensive assessment of the innovated design of the software. So patenting software is practically more complex than applying for a copyright but affords more stringent protection. On the latter phase of this paper the intricacies of software patenting would be elucidated in brief.

The third industry standard software IP protection mechanism is "Trade Secrets". This form of IP protection features the best protection for the initial source code of software. This form of protection scheme has more advantages than software patenting or copyrighting.The essence of trade secret protection of software implies that the originally crafted source code would be kept confidential and whoever has internal access to such software will agree on the terms to keep it secret from third party. Unlike copyright and trademarks,trade secret has little to no formalities since the developer and owner of the source code are contractually bound to keep the IP confidential no matter what.

This segment of the paper would highlight the scopes of software IP protection by elaborating on the copyrighting, patenting and trade secrets of Software IP through the lens of international and national law along with the latest trend in software IP protection in the contemporary world

(A) Copyrighting Software IP

Copyright protection is one of the widely acceptable IP protection scheme in practice and applicable to most literary, dramatic, musical and artistic works. The foundation of copyright protection of IP implies that the Copyright law provides protection to the author from unlawful reproduction or exploitation (P. Narayanan, 2017). In case of software IP the protection of copyright is afforded for same purpose.

To elaborate on the fundamentals of software copyright, it denotes protecting the "source code"

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as “literary work”. And according to the conventional copyright laws the literary work is being granted protection from duplication and reproduction. But what are the criteria of knowing which part of the software represents literary work?.In general aspects a computer program source code is expressed as “Textual work” or literal construction of a program. Source coding is practically very different from the executed functions which are attained when the source code is administered through a computer. So the literal construction of software differs from the functional construction of the computer program. So since the functional /or utilitarian construction is different than the source code that’s why program behavior or the functional construction is necessarily outside the ambit of copyright protection but the textual expression or literal construction is protectable by copyright laws.

But if the program behavior or functional construction is expressive then such construction can be interpreted to be protectable by copyright, but such inference is quite challenging since different software has varying degrees of functions which may or may not be expressive.

International law has also specified in numerous treaties and conventions the essence of protecting software IP by Copyrighting. WIPO (World Intellectual Property Organization) Copyright Treaty (WCT) 1996, Universal Copyright Convention (Paris Act 1971) all affirmed that computer program or software will be afforded protection but fails to elaborate on the dispute settlement procedures for software IP violations. Whereas the TRIPS (Trade-Related Aspects of Intellectual Property Rights) agreement 1995 emphasizes on the domestic dispute settlement procedures for infringement of software IP. The proper implementation of international copyright laws can be successfully cherished by national legislations. In this paper the national copyright protection of Software IP in the context of European Union, USA, India and Bangladesh would be illustrated in brief.

European Union through Directive 2009/24/EC incorporated a specific enactment aimed towards protection of computer programs in different countries under EU. This directive added computer program to be protected as literary work. And protection scheme is offered to author’s own intellectual creation, and the expression of the computer program will be afforded protection under copyright law of EU. The authorship applies to the developers who originally created the program.

In United States however the authorship of a copyright includes anything that a software developer creates. Such creation can be a specific mobile app which can include its “original source code, design layouts, textual content, images, and graphics”. According to the US Copyright law, when the author creates an original work.

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Reproduction right to the author is granted as soon as the original work is registered through US Copyright office. And in case of any infringement the right holder is granted the power to enforce their rights through federal court of USA.

In India the software or computer program however have strong advocacy for protecting software. India has Copyright Act 1957 which includes special provisions to secure copyright of software IP. India has made significant amendments to The Copyright Act 1957 to make it consistent with the international standards. According to this Act a software or computer program shall include any textual work, databases transferred into machine readable which is the functional aspect of any computer program and as such recognized as "Literary Work". Moreover, the act also prescribed extensive infringement remedies which widen the scope of the Act even more. In Bangladesh however the IP protection awareness for the Software is rather limited.The major statute which governs the Copyrighting of software in Bangladesh are The Copyright Act 2000, and The Copyright Rules 2006. According to the Act a "Computer Program" is known as "set of instructions expressed in words" and the textual instructions sets are being granted copyright protection under this Act. But the same act specifies that to be a "literary works" the computer program must be intended to be used for "study and listening of people in general". So there are significant anomalies when it comes to clarifying literary work and how it should be contrasted with the actual practice. Although the Copyright Rules 2006 does include provisions to register software, mobile apps under copyright office of Bangladesh which provides some sort of legal protection to the developed software and computer program from unauthorized reproduction and duplication.

(B) Patenting Software IP

Patent IP protection is geared towards recognizing and protecting new inventions in the field of science, medicine and technology mostly. Patents may be granted for the invention of any new and useful process machine, manufacture or composition of matter or any new useful improvement thereof (Gerald B. Halt et al, 2014). Patenting software innovation coming from software industry are more complex then tangible inventions for instance mechanical and electrical systems. Intricacies of software inventions require careful precise claims and descriptions.

While the software copyright protects the source code from being duplicated but it doesn't prevent independent reverse engineering or independently developing the same software. And the patenting of software IP can grant the right holder the exclusive claim over the functional aspects of software which is granted patent protection. Most technical software which

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extensively improves the computing experience for instance developing new memory structures for computer, creating database structure for software are usually granted patent protection. Granting patents are much more difficult than seeking copyright protection.

In the United States, Software and Computer programs are granted the patent protection. US patent and Trademark office applies two step methods to assess the eligibility of software to be granted as patent. Firstly an invention must be an "abstract" idea and secondly that "abstract" idea must be transformed into patentable subject matter. The patentable subject matter must have brought "something new" to the computer field or somehow contributes towards improving computer operating experience.

In the EU the European Patent Office (EPO) provides that for corporate software patenting when a software process solves a "technical problem to achieve a technical solution" that is enough to attain software patenting. In order to claim a successful software patent at EPO the applicant must at first draft an application which would clarify the specific details of the technical achievements of the individual software subject to be patented.

In India software patenting is a complicated achievement for software IPR holders and at first instance software is generally considered as non-patentable in India as per Patent Act 1970. But recently in 2002 the Parliament of India has assented towards granting software patent under very exceptional circumstances. These circumstances include the software must be a discrete invention which must provide a technical effect. Finally, the software subject to be patented must be more than a technical achievement meaning there must be some sort of tangible elements which must interact with the software. To be patentable software must be more than an algorithm and must convey some technological invention in India. So these rules suggest that attaining a software patent in India is still a challenging phenomenon.

(C) Trade Secret and Software IP

Copyright and patent protection of software IP is solely grounded towards statutory law. But as regards to a reliable protection "trade secret" can be cited here. It is a doctrine that is developed out of the common law doctrine of unfair competition and unfair business practices ((Gerald B. Halt et al, 2014). For corporate IP protection trade secret is relied upon with excellence. When the other IP protection practices such as copyright, patents etc. only protect the duplication of the software but don't provide secrecy to the software.

Trade Secret is confidential corporate secret which in terms of business software are processes, methods, recipes that aren't known to the outside world. Most technology manufacturers such as google, apple, Facebook has their own algorithm which are trade secret coded software

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proprietary to the tech manufacturers. And in case of leaking of such secret gives the manufacturer the legal cause of action to sue the party which disclosed the secret.

Each developed nations has incorporated trade secret laws to preserve software IPs. Forinstance, in USA the Universal Trade Secret Act (UTSA) 1985. UTSA is unique because it contains special provisions to safeguard the trade secrets of the software IPs.

(D) Recent Developments

Contemporary inventions rely heavily on digital technology and software development plays significant part in this endeavor not only for block chain crypto currency, AI application or physical sensors, medical apparatus, drones, robotics and many more relies on extensive usage of software innovation.In 2021 alone several high profile tech industries is backing up Patent protection for their Artificial Intelligence (AI) software. For instance, United States Patent and Trademark office (USPTO), European Patent Office (EPO), and French Parliament are all on board to support AI generated softwareIPs.

Recent developments in IP law practices suggest that IT industry are now presuming Copyright being the most flexible form of IP protection is now proving to be limited to provide ample protection in certain forms of duplications. And incessant malpractice of software reverse engineering is discouraging IT firms from choosing trade secret policies all together. And patent being a stringent form of IP protection is proving to be critical to the IT firms worldwide.

Recently extensive emergence of SOC (system on chip) device driver software is getting diversified attention worldwide. Rapid innovation in hardware technology and advent of sophisticated software solutions are likely to mitigate differences between hardware and software. In this context innovation being fundamental to determine the patentability won't be easily divisible between hardware and software.

Moreover, recently the software piracy being rapidly gaining notoriety is suggesting that copyright protection is proving to be insufficient to deal with extensive copying, modifications by hacker which is further compelling the IT industry to move away from copyright and concentrate more on Patenting instead. But trends also suggest that DRM (Digital Rights Management) framework worldwide is gaining much popularity in the tech industry for its unique ways to safeguard copyrighting.

III. CHALLENGES OF PROTECTING SOFTWARE IP

In the highly competitive technology industry it is incumbent upon the developers and owners of the software and computer program to take adequate steps to protect their IPR. The problems

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associated with protection of Software IP are rather complex and difficult to resolve. Primarily it is a combination of exclusive right and reproduction or duplication.

Complexities are more severe because the rights are intangible. Conventional software IP mechanisms do provide security to the software but each protection mechanisms has its own flaw. So this chapter in this write up would familiarize the readers with the imminent challenges of protecting software IP by elaborating on the infringement practices of software IP and how it relates to the licensing agreements of software IPR, later how fair usage creates challenges in software IP protection enforcement, finally manifesting how copyright and patenting may overlap and create potential conflict of interest.

(A) Infringement of Software IP and Licensing Agreements

Most of the time a software IP is breached when a third party is granted limited permission to use it and breach occurs when licensee doesn't adhere to the licensing terms. After software licensing when a licensee breaches license agreement with a massive technology company then they will likely encounter multimillion dollar software infringement litigation. Mostly the infringement of software IP occurs when somehow the source code is compromised by the third party. Prevention of infringement of software IP requires appropriate auditing protocols and mechanisms which will further ensure proper compliance of the licensing agreement.

Auditing functions in a software licensing agreement is that a "self-executing enforcement auditing code" which is integrated in the software as a licensing agreement compliance mechanism. These codes intelligently notify the concerning authority of potential breaches and infringement of software licensing agreement and breaches of software licensing contract.

Additionally, software license agreements can be strategically used to increase the likelihood of an immediate victory in intellectual property infringement litigation.The parties will certainly discuss the safeguards provided to the licensors, as well as to end users and other users of the technology, during the license negotiation process.

Both in the master service agreements with technology companies and in the individual software licenses, the Licensees frequently make errors or do not completely comprehend the license restrictions. As a result, licensees may be obliged to upgrade their licenses and pay higher royalties when auditing code and protocols uncover license agreement violations. They may also be subject to civil action damages.

Large technology corporations can file lawsuits to demonstrate to its clients and partners that they are serious about upholding the terms of their service and licensing agreements. An attorney with expertise in software contracts is now absolutely necessary in this situation.

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(B) Fair Usage of Software IP

In the tech industry fair usage plays pivotal role in the case of enforcement of software IPR. Fair usage is a legal exception in the case of utilizing a copyrighted work, In the widest terms, a fair use is any copying of intellectual property done for a specific, "transformative" reason, like to parody, critique, or comment on a work that is protected by intellectual property.In the historic case of Google LLC v. Oracle America, Inc , for the first time Google first incorporated the notion of fair usage for copyrighted software.

On the contrary this practice gives the public the access to the software without really owning the IPR. Fair usage policies of copyrighted work are exclusive to individual copyright laws of the country. Since software IP falls under literary works so fair usage of software IP is also practicable. When it comes to software IP fair usages often the tech companies for instance video game copies which are licensed and copyrighted are often given to the independent reviewers who make unbiased remarks after using it under fair usage policy. But sometimes in the name of public scrutiny the fair usage exceptions is excessively used by hackers and rival competition.

(C) Overlapping of Copyright and Patent

Contrary to the fundamental goals of intellectual property laws, overlapping intellectual property rights enable an ineffective and overbroad protection regime.When it comes to protecting computer software, the overlap between copyright and patent regulations is particularly evident. But still it is considered as a industry leading practice for protecting the core aspects of a commercial software or computer program and most IP expert law firms often encourages the tech industry to rely on this method of dual protection to strengthen the IP framework of their software.

In the software sector, conflicts between copyright and patent rights are particularly challenging. Computer software offers a special overlap since many programs meet the requirements for both copyright protection as an original literary work and patentability as a novel, non-obvious, useful invention.

Overlapping of intellectual property protection for computer software result in uncertainty for parties looking to innovate in that industry and it incurs higher transaction costs for customers and rivals, andin general create inefficiency.These contradictions often dissuade the software developers from innovating in the tech industry because of fear of involving in complex IP litigations

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IV. FINDINGS

1) In case of IPR of software products copyrighting imposes difficulties in case of ascertainment of literary and utilitarian aspect of a given software program because each source code of a software changes when executing it through a computer
2) International intellectual Property Laws treaties and conventions do recognize the need for protecting software IP but the implementation of the same rests on the domestic legislation
3) Among domestic laws US and India affords easy copyrighting of software IP and rules for codifying mobile apps as software IP is also included in those copyright laws
4) On the contrary Bangladesh has Copyright laws and recognizes Computer Program as literary work but registration of mobile apps rests on the Copyright Rules 2006.
5) Software copyright only protects the duplication of source code but it doesn't provide protection against reverse engineering which can only be protected by patenting the same software.
6) In US software patenting must comply with statutory policies and must be nonobvious and innovative in EU the European Patent Office (EPO) provides special rules of complying with technical problem solving element of software patenting
7) On the contrary in India the software patenting is granted very rarely
8) So software patenting although affords more stringent form of protection but availing the same is not as easy as copyrighting
9) Trade secret on the other hand offers best protection to software IP but includes convoluted corporate agreements and confidentiality terms.
10) Nowadays software is becoming a pioneer in digital innovation, so IT firms worldwide now more concerned with availing patent for their software IPs.
11) Digital Rights management (DRM) is a newer way to preserve the copyright of software more efficiently through implementation of safeguarding mechanisms in the digital assets
12) Software IP involves licensing agreements or terms of use with the tech companies and upon infringement of such terms of use by licensee often involves multibillion dollar litigations and the fear of which dissuades the software developers from innovating

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13) Unauthorized and excessive use of software ip in the name of fair use hampers copyright regime of software IP

14) Finally overlapping of software ip as regards to corporate practice is frequently availed but it is uneconomical and inefficient and involves expensive litigations which hinders software innovation

V. RECOMMENDATIONS

After analyzing the findings of the study the below mentioned recommendations can be formulated:

1) In order to smartly prevent infringement of copyrighting of digital assets the software manufacturer can invest on DRM (Digital Rights Management) "activation code" mechanism. Through availing DRM facilities the software manufacturer can effectively prevent duplication in the cyber space.

2) No matter the mechanisms the software developers must confer a flexible model of software usage policy which would change based on the customer's entitlements for example removing access rights after a certain time.

3) If the software has literary aspect predominant then that software IP would be protected under Copyright and DRM would be availed for digitally restrict further duplication and unauthorized access.

4) If the software has utilitarian aspect predominant for example if the IP is intended for industrial development then such software IP should be given patent protection or for added protection trade secret policies can also be availed by the owner of such software IP.

5) In times of expensive IP litigations the developers of the software should be given ample exceptions from litigious intricacies.

6) Overlapping of Software IP may be availed only if the software IP in question has greater risk of duplication and reverse engineering.

7) IP laws in domestic legislation framework should include easy to contemplate interpretation of "software", mobile apps, GUI, databases and other elements of software IP and should include clear regulations as procedures forpatenting and copyrighting software or elements of software as per the substantive analysis.

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VI. CONCLUSION

Intellectual property right is the creation of creativity. Unlike any literary, innovative work in the field of intellectual property, Software or computer program has also acquired a place of significance. Software innovation has accelerated trade and commerce and automated the day to day convenience in life . But if the software developers are not encouraged by protecting their IPR then innovation in the technology industry cant be contemplated but identification of software IPR isn't easy since software elements aren't easy to dissect. So to shed some light in this research gap this paper thus aims to demonstrate the underlying scopes of software IPR from a non-technical standpoint and eventually clarifying the challenges of availing software IPR in the conventional technology industry.

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