Intellectual Property Rights for Software, Artificial Intelligence and Computer Related Inventions: A Comparative Analysis

Faham Ahmed Khan[†]

University of Cambridge, United Kingdom

The growth of digital technology has been one of the highlights of the 21ˢᵗ century. This has led to the growth of the development of new Software and Computer-Related Inventions (CRIs). The grant of Intellectual Property Rights protection to these inventions has been questionable since they have been explicitly excluded from IP protection statutes across the world. However, as time progresses, legislatures across the world have been under pressure to provide some sort of protection to such inventions. This has resulted in amendment of laws and a criterion has been devised to protect CRIs and software. The approach adopted towards the same varies from country to country. Moreover, there has also been a rise of inventions generated using Artificial Intelligence (AI). AI has made the process of invention much easier since the mental element is taken care of by the AI. However, questions are raised regarding the grant of IP protection to such inventions for the lack of an inventive step. The paper analyses the scope of protection granted to Software and CRI across different legal systems in the world. It also explores the possibility of the application of these principles to AI or the modification of existing principles to allow for the patentability of AI.

The digital era has seen a plethora of inventions in the form of software and computer programs. The industry is expanding at a rapid pace and the lack of clarity related to the grant of IP protection to such inventions can be detrimental to the innovation in this field. The lack of consensus at the domestic as well as the International Level prevents the formulation of a uniform system regarding the grant of IP protection to such software. Moreover, the kind of IP protection to be granted to software is also debated with conflict between the grant of copyrights and patents. The digital world is open and accessible to everyone and there is a tendency that the innovations and inventions are misappropriated without providing the due credit to the original creators. Therefore, it is important to regulate the grant of protection to such inventions. The Jurisprudence developed by India and the United States of America related to Software development has been discussed.

IP Protection to Software in India

The legislation responsible for the grant and regulation of patents in India is the Indian Patents Act, 1970. An invention should satisfy the following criteria under the Act to be granted a patent:

(i) Novelty: the invention must be new and original

(ii) Non-Obviousness: The invention should not be obvious to any person possessing ordinary skill set in the respective field.

(iii) Industrial Application or Utility: The invention should be useful. It should be capable of being applied in the industry to obtain the desired result.

Any invention fulfilling the above-mentioned criteria should be eligible for the grant of patent. However, Section 3 of the Act excludes certain inventions from the category of inventions. Section 3(k) of the Act provides that, *"A mathematical or business method or a computer programme per se or algorithms"* are inventions excluded from the ambit of patent protection.

The words *"per se"* were added into the Section 3(k) through the Patent (Amendment) Act, 2002. The addition of this term was done with the view that the inventions which are ancillary to computer programs are not rejected in an outright manner.

The significant change with regards to software patents occurred in the year 2013 with the introduction of Computer Related Inventions (CRI) Guidelines.

Judicial Decisions by Indian Courts

In the case of *Sunray Computers* v *Cce*,[1] it was observed that, *"without the software, the hardware is incomplete, a mere 'dumb box' of no use at all to the*

[†] Email: khan.faham@gmail.com

customer." Moreover, in the case of *Ericsson* v *Lava*[2], the Delhi High Court held that, *"It should be noted that mere reference to the use of a 'procedure' or a 'method' or an 'algorithm' in an apparatus which comprises of various network or hardware elements, components etc. so as to bring about a technical effect or to perform a technical process does not reduce/makes the claimed invention an algorithm or computer program per se or even a mathematical method or formula as contemplated under Section 3(k)."* Therefore, the Indian courts had thought about the grant of patent protection to software even prior to the CRI Guidelines. The landmark case of *Ferid Alani,* which changed the landscape for software patents in India, has been discussed in the subsequent section.

Patentability of Software

As discussed earlier, there are several conditions which need to be fulfilled for an invention to be classified as a patent. The grant of patents for software-related inventions has started at the global level. However, only a limited number of patents will probably be granted since it is relatively difficult for a software program to meet the criteria of novelty and non-obviousness.

Article 27 of TRIPS provides that, *"Patents shall be available for any inventions, whether product or process, in all fields of technology provided that they are new, involve an inventive step and are capable of industrial application."* Therefore, the guiding document for Intellectual Property at the International Level is conducive towards software patents since it does not specifically bar any kinds of patents. It provides flexibility to the countries to develop their own interpretation and rules for the grant of patents. The approach of three legal systems towards software patenting has been discussed below.

Yahoo v *IPAB*[3]

It was one of the first decisions which involved the grant of patent to a business model in India. The ruling by the court was not a positive one and the IPAB upheld the view that the pure methods of doing business are not patentable in India. The case involved an application filed by Overture Services Inc. The application was for a "*System and method for influencing a position on a search result listing generated by a computer network search engine".* The contention of the plaintiffs was that their business model was novel and they should be granted patent protection.

The application was later amended to *"A method of operating a computer network search apparatus."* It underwent examination at the Indian Patent Office. There were 17 objections raised by the examiner in the First Examination Report (FER). The examiner stated that the criteria of novelty were not fulfilled as the claims fell under Section 3(k). Yahoo contended that the new claims included technical subject matter and were novel in nature. However, they were again rejected by the examiner as they fell under Section 3(k).

A pre-grant opposition was also filed by Rediff against the application. The controller informed Yahoo that the novelty and patentability test was not passed by the application. The case was appealed by Yahoo before the IPAB. The IPAB dealt with the case comprehensively and disposed of the petition. The definition of business methods which was present in the Manual of Patent Procedures 2008 was considered. It provided that business methods which are claimed in any form are not patentable. It came to the understanding that the exclusions from patentability are carved out for all business methods irrespective of the fact that they are technologically supported or not.

It further examined the law related to the patenting of business methods in UK, European Union and the United States. The comparative analysis allowed the court to come to the conclusion that unlike the other jurisdictions, India is a country where the law specifically excludes such business methods patents through statutory language. Therefore, the IPAB explicitly prohibited patents for business methods irrespective of the technological steps involved. This was a setback to such innovation and as discussed further, a utility model can assist in providing such protection.

A New Ray of Hope with the Promulgation of Computer Related Inventions Guidelines

The aim of these guidelines is to provide for a uniform and consistent manner to deal with applications that are related to Computer-Related Inventions (CRI). The primary motive is to provide clarity with regards to the exclusions provided under Section 3(k) in order to ensure that the eligible applications for patents related to CRI can be examined in an expedient manner. Section 2(1)(l) of

the Indian Patents Act, 1970 states that a 'new invention' means *"any invention or technology which has not been anticipated by publication in any document or used in the country or elsewhere in the world before the date of filing of patent application with complete specification, i.e., the subject matter has not fallen in public domain or that it does not form part of the state of the art."* The term 'new invention' also includes the word technological inventions. It has specified that the meaning given by the Oxford Dictionary will be used to interpret the term 'algorithm' which has been defined as *"a set of rules that must be followed when solving a particular problem."*

The First Draft Guidelines were notified in 2013 to provide a forum to debate the content and applicability of these guidelines. The concept of *"technical effect"* in reference to *"technical advancement"* which had been a requirement under Section 2(1)(ja) of the Patents Act, 1970 had been recognized for inventions related to computer.

The latest Guidelines provide for more clarity when processing patent related claims related to CRIs. Paragraph 4.5 of the guidelines provides that,

"It is well-established that, while establishing patentability, the focus should be on the underlying substance of the invention and not on the particular form in which it is claimed. What is important is to judge the substance of claims taking whole of the claim together. If any claim in any form such as method/process, apparatus/system/device, computer program product/ computer readable medium falls under the said excluded categories, such a claim would not be patentable. However, if in substance, the claim, taken as whole, does not fall in any of the excluded categories, the patent should not be denied."

This is a departure from the earlier version of the guidelines which provided for a specific three-step test and strict principle of exclusion. This widens the ambit of what can be considered as patentable subject matter and will allow for a greater number of claims to go through if they can demonstrate *"technical effect"* and *"technical advancement"* and do not explicitly fall under any of the excluded categories. The illustrative examples related to patentable and non-patentable claims have been removed under the latest guidelines. This was done to avoid unintended consequences.[4] The task of the patent granting authority as well as the applicant will be made much easier with such Guidelines and represents a definitive

move towards the recognition of software patents by India.

Ferid Allani v *Union of India*[5]

In this case, an application for the grant of patent was filed by the petitioner. The request was rejected with objection of non-patentability under Section 3(k) of the Patents Act, 1970 raised. The order was challenged via a Writ petition. Subsequent to its filing, the Indian Patent Office was directed by the High Court to review the application and allow the applicant to be provided with an opportunity of being heard. The application was against refused by the Controller and an appeal was filed before the Indian Patent Appellate Board (IPAB). The application was dismissed by IPAB since it did not disclose *"any technical effect or technical advancement"*.

The applicant again filed a writ petition before the High Court where he stated that, *"the invention is more than a mere software that is loaded onto the computer and the application does disclose a technical effect and technical advancement."* The Delhi High Court accepted the application and directed the Indian Patent Office to re-examine the application. It further stated that, *"an invention would not become non-patentable simply for simply for that reason that it is rare to see a product which is not based on a computer program and that the effect of such programs in digital and electronic products is crucial in determining the test of patentability."*

The application was again rejected by the Indian Patent Office. However, on challenging the order before the IPAB, the patent was granted. A key feature of the invention was identified by the IPAB which was that the invention is *"forming a well-constructed query which is to be emitted to the internet, which solves a technical problem of prior art technologies producing a technical effect of reduction of bandwidth by the structured query"*. It applied the definition of *"technical effect"* or *"technical contribution"* taken from the CRI Guidelines. The patent was granted eventually. It was a great leap forward for software patentability in India since now a software can be granted a patent if it fulfils the criteria of *"technical effect"* and *"technical advancement."*

United States of America (USA)

The US Patent Office (USPTO) has usually been pretty liberal in granting patents for a plethora of inventions. This has often put USA at loggerheads

with other nations of the world over the lack of liberalism when granting patent protection. However, when it comes to software patenting, the approach followed by the USA has bucked the usual trend and they have often held software to be a mathematical formula, incapable of being patented.[6] It relaxed its stance to an extent in the case of *Diamond* v *Diehr*[7] where it was held that, *"the invention should be looked at as a whole and patent protection should not be denied only because it contains mathematical formulae."* However, the ruling did mention that two exclusions will remain in place, namely *"mathematical algorithm"* exception and the *"business program"* exception.

The new found jurisprudence was applied in the case of *Diamond* v *Diehr*[7] where an improved method used to cure rubber was developed. The method relied on the usage of a computer program for the calculation of the curing time. As per the previous decisions, it included a mathematical formula and should have been excluded from patent protection. However, the Court found merit in the application since the product developed had industrial application. The mere presence of a computer program using a mathematical formula does not provide sufficient grounds for rejection of the application.

In the aftermath of this case, a two-step test was introduced by the Court of Custom Patents and Appeals (CCPA) which was to be applied to scrutinise patent applications which involve the use of a mathematical algorithm. This test is known as the *"Freeman Water Abele Test."* It provides that:

"(i) The claim is to be analysed to determine whether a mathematical algorithm is directly or indirectly recited; and

(ii) If a mathematical algorithm is found, the claim as a whole is further analysed to determine whether the algorithm is applied in any manner to physical elements or to process steps."

If an invention satisfies both the tests in affirmative, it will be patentable. The applicability of this rule has been jittery and non-uniform. In the case of *Alappat,*[8] the Court held that no patent protection can be granted to software as a subject matter. The practical application of software was involved in the claim due to which it was denied a patent. The *"Freeman Water Abele Test"* was rejected by the Court in the Case of *State Street Bank & Trust Co.,*[9] even though it held that a computerised business program can be granted a patent protection if it produces *"a useful, concrete and tangible result."* The reason for rejection of the test was stated that, *"After Diehr and Chakrabarty the Freeman-Walter-Abele test has little, if any, applicability to determine the presence of statutory subject matter."*

This makes it clear that the approach followed by the USA has largely been similar to that of India where it necessitates that there must be a practical application of the patent. It must do more than merely manipulating an abstract idea to be granted patent protection. The USA also has 'Examination Guidelines for Computer Related Inventions'. They provide that in order to be a statutory subject matter, a claimed *"computer-related process"* must either:
(i) "Result in a physical transformation outside the computer for which a practical application in the technological arts is either disclosed in the specification or would have been known to a skilled artisan, or
(ii) Be limited to a practical application within the technological arts."

They have diversified the scope of patent protection which can be granted to Computer Related Inventions which involve the usage of software. In the *re Tomacase,*[10] the Court held that, *"computer programs for the translation of natural languages are patentable."* See also, In *re Pardo*[11] it was further held that, *"computer program for executing several equations regardless of the order of their input are patentable."* The system software too has been held to be patentable in the *re Chatfield*[12] case. In order to further embark on the point of the wide scope of protection, it can be seen that even the processes or apparatus that use computer programs as a component of the overall invention have been found patentable. This was done in the *re Abele*[13] case where a technology developed to improve the procedure of CAT scan was granted a patent. This shows a progressive approach where the Courts have started to focus more on the applicability, the development and the practical aspects rather than merely rejecting patents due to theoretical conceptions. The major risk faced by USA is excessive patenting which can make costs of innovation extremely high and discourage future patenting. However, the liberal jurisprudence will be up for an interested challenge when it would need to analyse the challenges related to Artificial Intelligence and Machine Learning.

European Union

There have been a number of debates regarding software patents in India. The European Patent Convention provides that, *"in order to in order to be patentable, an invention has to be susceptible to industrial application, it has to be new and it must involve an inventive step."*[14] On novelty, the EPC states that, *"An invention shall be considered to be new if it does not form part of the state of art."*[15] Article 52(2)(c) of the EPC specifically excludes *"methods for ... doing business, and programs for computers"* from the definition of inventions which are eligible for patent protection. Despite this, over 30,000 software patents have been granted since the year 1978.[16]

Article 52(3) of the EPC provides that, *"Paragraph 2 shall exclude the patentability of the subject matter or activities referred to therein, only to the extent to which a European patent application or European patent relates to such subject matter or activities as such."*

Similar to the clause *'per se'* in India, the "as such" clause has allowed the European Patent Office to accept patent applications that appear to be excluded as computer software inventions. There have been multiple instances where the European Patent Office has granted a patent where there was an involvement of software. In the *Viacom Case,*[17] a patent was granted by the Board of appeal for a method which improved the digital processing of images. The basis for granting the patent was taken to be the fact that a technical process was involved. In the case of *Koch & Stezel,*[18] The EPO held that,

"An invention must be assessed as a whole. If it makes use of both technical and non-technical means, the use of non-technical means does not detract from the technical character of the overall teaching."

However, in the case of *Controlling Pension Benefit Systems/PBS Partnership*[19]*,* a different approach was taken by the European Board. They stated that, *"The specific wording of Article 52(2) of EPC referred to schemes, rules and methods as being excluded from patentability, but had no mention of an apparatus as being excluded from patentability…Methods only involving economic concepts and practices of doing business are not patent eligible, however, an apparatus constituting a physical entity or concrete product, suitable for performing or supporting an economic activity, is an invention within the meaning of Article 52(1)."* This does not discuss the requirement of *'technical contribution'* and limits any concrete exclusions from the ambit of patentability. Therefore, the scenario related to software patents in EU is still uncertain. There is a need for more consistency in the future.

Comparative Overview of India, USA and EU

The discussion on the laws of the above states makes it clear that software patents are not applied uniformly across different legal systems. Europe and India both have adopted a stricter approach by necessitating the inclusion of *"technical advancement."* The USA on the other hand has exercised a liberal approach even when it comes to software patents. They have even allowed for the application of formula to be patented. This is way different from the Indian and European approach which necessitates a stricter scrutiny of the patent claim of the applicant.

India and European Union, both had legislations which strictly excluded software patents. However, they were interpreted in a liberal manner to ensure that they are able to grant patent protection to software fulfilling the criterion of patentability. They both have taken progressive stances in the *Ferrid Allani Case (India) and Pension Benefit Systems Partnership Case (EU)* to increase the ambit of patent protection for software. However, compared to USA, they have shown comparatively lesser tendency to grant Intellectual Property Protection to everything under the sun and have followed a guarded approach when granting such patents.

Copyright Law and Software: Analysing Development of Jurisprudence at a Global Level with respect to Idea-Expression Dichotomy

The aim of the copyright law is to protect the expression of the idea and not the mere idea itself. This is due to the reason that ideas are inherently developed in the human mind and are a part of the innovation process. In case, ideas are allowed to be copyrighted, it will hinder creativity and innovation. This gives rise to the idea-expression dichotomy which is used to determine to what extent a work is copyrightable. The separation of ideas from expressions is a hard task. It gets more complicated when it comes to computer programs since there is the presence of literal and technical expressions. There is no statute which provides guidance for the same. The core concepts have been developed through the

jurisprudence of the courts who have interpreted the existing law to deal with the issues brought before it. The Indian Copyright Act, 1957 does not define the term 'idea' or expression. Article 9(2) of the TRIPS Agreement provides that protection is only provided to expressions and not ideas. Article 1(2) of the *"European Union Software Directive"* states that, *"ideas which underlie any element of the computer programme are not protectable."* Therefore, it is up to the courts to formulate distinctions between ideas and expressions.

The computer industry has grown by leaps and bounds over the last few years. There are several companies whose valuations are over a million dollars. One of the key components of their success is the unique programs they create. In case, they are unable to protect the programs and the expressions of ideas, it can lead to software piracy. This can be disastrous for them on an economic and moral level. It will also discourage future innovations. Therefore, the courts need to take a proactive stance in the protection of expression of ideas and the resolution of the idea-expression dichotomy so that the hard work of the programmers is protected without any roadblocks to future innovations.

Idea-Expression Dichotomy

The case in which the concept of idea-expression divide was introduced is *Baker* v *Selden.*[20] The plaintiff in the instant case had devised a technique to enhance bookkeeping by arranging the columns and headings in a certain way that made the reading of the ledger simpler. The defendant achieved a similar outcome by arranging the headings and columns in a different way compared to the plaintiff. The court held that the publication and sale of the book will have the protection of the copyright law. However, the concepts depicted in the book are not eligible for copyright protection. This case established the difference between an idea and its expression. If the idea was allowed to be protected in the instant case, no one would be allowed to think of alternative methods to do the same theme which would adversely affect innovation.

Computer Programs and Idea Expression Dichotomy

One of the first cases in which the court was faced with the task of discerning between idea-expression dichotomy in computer programs was *Whelan*

Association Inc. v *Jaslow Dental Laboratory.*[21] A computer program had been developed by the plaintiff for the defendant called *"Dentalab."* A program performing similar functions but in a different computer language was developed by the defendant which was named *"Dentcom."* It was marketed as the successor of *"Dentalab."* This led to the copyright infringement suit being filed before the Court.

The Court acknowledged that human creativity is needed in the development of a computer program and its algorithm. In order to determine copyright infringement, the Court has to first identify the copyrightable elements in the program of the plaintiff and determine which of them have been copied by the defendant. The Court refereed to the case of *Arnstein* v *Porter*[22] where the extrinsic and intrinsic test had been used in order to determine the copyrightable elements in literary works. It was held that only the extrinsic test was applicable since a common person cannot understand the intricacies of a computer program unlike literary work. The Court focussed on the purpose of the two programs and concluded that their operation and structure were not essential to this task. The expression in the instant case was found to be the detailed structure of *"Dentalab."* It relied on the *Baker* case and held that no protection is to be granted to the file structure since it is a blank form. However, it held if they are sufficiently innovative and the way information is arranged is informative, protection can be granted. Therefore, protection was granted to the plaintiff.

This paved the way for a regime of rigid protection which led to the hindrance of innovation. There was failure at the end of the court to consider the possibility of multiple expressions in the same programme.

A similar question was posed in the case of *Lotus* v *Paperback*[23] where the program involved was an electronic spreadsheet. The program that was developed first was *"Visicalc"* that was developed by the plaintiff. The defendants developed a program called *"VP Planner."* The programs performed the same functions and had some differences in the user interfaces. These were limited to menu structure, commands and language. The court had to decide if the user interface of the program developed by the plaintiff could be protected or not. The court observed that, *"In general ideas are not copyrightable. If, however, the expression of the ideas has elements that goes beyond all functional elements of the idea itself,*

and beyond the evident ones and if there are various other ways of expressing the idea, then those elements of expression, if substantial and original, are copyrightable." It used this reasoning to hold that the defendant copied the Macro command language of the program of the defendant. It granted protection to the menu structure, long prompts, macro commands etc. It held that it was a substantial copy. This decision was again bizarre since the court granted protection to the components of the menu command structure. This leaves other programmers' little option but to use absurd synonyms which would adversely impact the user-friendliness of the software. This was again seen to be a potential roadblock to future innovation.

There was a clash between two modern day tech giants in 1994 where they clashed over the Graphic User Interface.[24] They GUIs of both were registered for copyright as audio visual works. The plaintiff had developed Macintosh and the defendant had developed Windows 1.0 where the GUI used was similar to that of the plaintiff. They both entered into a license agreement when a complaint was filed by Apple.

Microsoft partnered with HP for the development of Windows 1.0 and Windows 3.0. Apple was of the view that the new product that had been created resembled Macintosh more than Windows. Therefore, the scope of the license had been exceeded. The court was faced with the question that, *"If Microsoft had the right to transfer individual elements or design features from Windows 1.0 and can derivative products look more like Macintosh than Windows 1.0?"*

The court took note of the fact that more than 90% of the visual display elements had been licensed by Apple. Therefore, only a thin protection could be afforded to the GUI of Apple. In the instant case, it observed that there were only two options with the programmers, which are, *"either tiled or overlapping system and overlapping windows have clear preference in graphic interfaces."* It held that, *"When a concept and its expression are indistinguishable or have fused, the expression is only protected against near-exact duplication."* Therefore, no protection can be provided in the instant case and no copyright violation is made out.

The *Altai*[25] case involved a landmark decision where the court held that the method used by the programmer to design the program is also relevant. The court in this case held that, *"If a literary work's non-literal elements are protected by copyright, then a computer program's non-literal elements are also protected."*

Google had used the Java APIs and source code owned by Oracle in the initial version of its operating system Android. Oracle had contended that the components were copyrightable while Google claimed into was a fair use despite admitting the use of APIs. The Supreme Court ruled that the Java APIs used by Google were within the bounds of fair use under the copyright law.[26] It said that the aim of the copyright law is to promote innovation and facilitate development in the field of science and arts. Therefore, it can be applied in the present case.

Artificial Intelligence and Patents: A Step into the Future

The grant of patent to an artificial intelligence (AI) program called DABUS, an acronym for *"Device for the Autonomous Bootstrapping of Unified Sentience"* took the global fraternity by surprise. The grant was based on the novel way in which the AI came up with a better design for food containers which results in the improvement of grip and heat transfer. This was significant as a machine was treated to be capable of inventive step.[27] However, the response was in affirmative only in South Africa with US, UK and USA rejecting the application.

The European Patent Office (EPO) was of the view that even though AI programs are capable of doing more than what the human inputs allow them to, they still lack *"an autonomous will, self-awareness and personality in the way that humans have them."* Therefore, at the present moment, the legal norms which regulate the allocation of the inventor of an invention cannot be applied for AI. The more significant debate is the purpose which will be served by granting the patent to an AI since it will not be able to avail the benefits of the patent in the manner, they are available to the human beings. The patent would probably be utilized and exercised by the inventor of the AI and not the AI itself.

Therefore, the grant of patents to AI seems intriguing and innovative. However, as of date it does not serve any practical purpose for the AI. That being said, the grant of patent to the developer of the AI can be a fitting reward for the hard work put into making such a capable program. The Jurisprudence on the subject is largely unclear. Therefore, it is essential to come to a consensus with respect of grant of patents

to AI. The field is largely unexplored and still at the nascent stages of development and needs careful attention for effective development in the future.

Social Aspect of Intellectual Property Protection for Software and AI in India

India is one of the fastest developing nations of the world. It has made rapid strides in the field of software technology and Artificial Intelligence. There is a plethora of innovation in India with the established tech giants, MSMEs and Start-ups all jumping on the bandwagon to innovate and create technologies to improve the standard of living of the general population and solve real-world issues. A strict regime of software protection would do them more harm than good as their inventions will be vulnerable to poaching from competitors and foreign firms. The strict interpretation against the grant of software patents would have worked against them. Therefore, by adopting a liberal approach, the innovation in India will increase. It will also enhance the possibility of success of schemes like 'Make in India' and 'Start-Up India', run by the Indian Government. Several of the companies run on shoe-string budget at nascent stage. Therefore, the right approach to grant them recognition and adopt their technology would go a long way in consolidating the status of India as an IT Superpower. Moreover, the increased access will also assist in reduction of digital divide in India which occurs on economic, gender and class lines. Technology is for the benefit of mankind and should be accessible to all.

The Way Ahead for Computer Related Inventions

Lack of Comprehensive Protection

There is a need to consider the protection regime for Computer Related Inventions seriously. The threshold of protection afforded by the copyright protection is low. The aim of the copyright is to protect the literal aspect of the software or CRI. However, it does not provide adequate protection to the functional aspects of software and CRIs. In the modern times, an application or a software can be made in different ways while the functionality and utility remain the same. In such instances, copyright protection proves to be highly ineffective as the concept can be copied without much difficulty and no legal recourse will be available.

Utility Models: A Potential Solution

The system of utility models for protection of "minor inventions" has been adopted by a few countries across the globe. The primary motive of this system is to protect such inventions through an intellectual property regime which affords a protection similar to patents but covers inventions which do not explicitly fulfil the requirements of patentability. Such models play an important role in promoting innovation and protecting such inventions. The holders are granted the exclusive right of preventing others from using the invention without their authorization for a limited period of time.

The requirements to provide such models with protection are less stringent compared to patents. In order for any form of intellectual property rights protection, it is essential that the element of 'novelty' is present. However, the other criteria like "inventive step" or "non-obviousness" can have a lower threshold or be completely absent. The term of protection is shorter than what is granted to patents. The process of registration is simpler and faster. The fees for such models are cheaper compared to other forms of patent protections.[28]

At present, the utility models do not fall under any International Treaty. As a result, no member state is obliged to follow a utility model system. It does not find any reference in the TRIPS Agreement either. Despite this, a number of countries have implemented the system of utility models for the protection of minor and incremental innovations. This has been done to provide flexibility to the patent system and complement it in a productive manner. The countries have further relaxed the novelty criteria to the extent where they have also allowed utility models to be filed if they possess local novelty.

Applicability of Utility Models to CRI's, Software and AIs

The research has shown that the current regime of intellectual property rights protection is insufficient when it comes to the protection of these inventions. Moreover, it needs to be understood that the inventions and developments in this field take place rapidly and the protection is required at a much faster pace than normal. The traditional means of IP protection like patents and copyrights guarantee protection for significantly longer periods of time. However, the time elapsed in the grant of such protection is significant. In addition to this, they undergo immense scrutiny and have strict standards which are needed to be fulfilled for the grant of protection.

The inventions related to technologies discussed under this paper do not necessarily fall under the purview of these mechanisms of protection. In such a scenario, utility models can provide an effective alternative to the existing regime for IPR protection. The low threshold of protection and the expedited grant of protection for a limited period of time fits in perfectly with the aforementioned inventions. The major roadblock in the adoption of utility models throughout the globe is the varying degree of acceptability and the lack of an international harmonising law for the same.

At the local level, the countries have the freedom and flexibility to adopt the utility model to promote innovation. The international agreement on such models might take some time to materialise. However, the regional cooperation amongst countries could be a useful tool to expand the reach of such protection on a reciprocal basis. The system can eventually be expanded at a global level and provide a viable alternative to the existing regime of IP Protection to protect software, CRI and AI based patents.

A New Hybrid Law for Software, CRI and AI

A significant number of technological inventions are replaceable and can do with utility models. However, there may be some inventions which form the core of a new technology and can form the basis for the invention of further technologies in the future. The development of such technology could take a significant amount of time and investment and the inventor would want to be adequately compensated for their efforts. In such a scenario, it will be critical to afford them adequate protection which the current regime does not afford.

Law is often said to evolve at a pace which is not in sync with technology. It seems that the law is again lagging behind compared to the technological developments. Therefore, there is a need to upgrade the intellectual property protection laws for protection of such technological inventions. At the moment, copyright is not sufficient as it only protects the literal aspects of technology and not its functional aspects. On the other hand, the patent protection is very stringent and not suitable to the current needs. In such a scenario, it would be practical to create a hybrid version of copyright and patent law which can protect both the functional and literal aspects of copyright.

The utility models can serve as a buffer until a new hybrid law is developed. The law can incorporate features of both patent and copyright laws to the extent where it is necessary to provide sufficient protection to technological inventions. This needs to be such where the requirement for novelty and the exceptions to technological inventions in patents can be removed. This will be important in affording them adequate protection and creating a robust regime for future technologies. Such a step can also form the basis for the development of IP laws for newer inventions like the metaverse in the future.

Conclusion

There is a lack of consistency at the International Level with respect to the scope of patent protection afforded to software. The comparative analysis of India, USA and EU highlighted how different influential legal systems in the world have different approaches when it comes to software patents. The International mechanisms like TRIPS provide guiding principles and basic set of guidelines to be followed by the nations. However, their interpretation is done by each nation at their own convenience. These divergent views are bound to create trouble when it comes to uniformity in grant of patents for the same invention under different legal systems.

The application of the idea-expression dichotomy to computer programs is a tricky task since a lot of variables have to be considered by the court. This leads to uncertainty and the dynamic and evolving nature of the programs means that a statutory legislation is difficult to being forward and enforce. The development of Machine Learning, Artificial Intelligence and other new programs has further complicated the task of the courts. Unlike literary works and movies, the analysis of computer programs requires technical expertise to distinguish the elements that are copyrightable. The courts have been attempting to use the precedents developed in earlier cases, for example it used the *Altai* test in the *Oracle* case. However, this raises the question of whether the same is applicable to the new set of facts or not. For now, it seems that the courts have their task cut-out with upcoming innovations and the best approach would be to have experts assist the court in determining the copyrightable element and allow for development of general principles so that the cases can be dealt with in a better way in the future. The consistent development of new technologies

necessitates a discussion on this subject sooner rather than later.

The following suggestions can be implemented for using the Intellectual Property Rights Protection for Software and Artificial Intelligence in a more effective manner in the future.

(i)   There should be a negotiation for adoption of a harmonious law for grant of patents related to software and Artificial Intelligence. Such discussions should be carried out keeping the possibility of future inventions in mind. Moreover, in the era of globalisation, technology transfer across the globe is rife, so non-uniformity in legislation will be detrimental to technology and innovation.

(ii) The grant of patents to software generated using AI is a new and unexplored realm of law. There needs to be a concrete discussion amongst stakeholders at the global level for the development of a uniform method for the grant of patent protection.

(iii) The Start-ups and other small companies around the world should be protected from bullying by the large corporation by ensuring that basic steps and mechanisms necessary for innovation are not patented.

References

1   *Sunray Computers* v *Cce,* 1997 (72) ECR 916.
2   *Ericsson* v *Lava*, 2015 SCC OnLine Del 8229: (2015) 62 PTC 90.
3   *Yahoo* v *IPAB,* W.P.NO.4462 OF 2010.
4   https://www.lexology.com/library/detail.aspx?g=55771347-7ee1-48f5-871f-12e61d735f74.
5   *Ferid Allani* v *Union of India,* WP(C) 7 of 2014, decision dated 12th December, 2019.
6   *Gottschalk* v *Benson,* 409 U.S. 62, 72 (1972).
7   *Diamond* v *Diehr,* 450 U.S. 175, 209 U.S.P.Q. (BNA) I (1991).
8   *Alappat,* 33 F. 3d 1526, 31 USPQ 2d 1545 (Fed. Cir. 1994).
9   *State St. Bank & Trust Co.* v *Signature Fin. Group, Inc.*, 149 F.3d 1368 (Fed. Cir. 1998).
10 *re Toma*, 575 F.2d 872, 197 U.S.P.Q. (BNA) 853.
11 *re Pardo*, 684 F.2d 912, 214 USPQ (BNA) 673.
12 *re Chatfield*, 545 F.2d 152, 156 n.5.
13 *re Abele*, 684 F.2d 902, 214 USPQ 682 (CCPA 1982).
14 EPC, Art. 52(1).
15 EPC, Art. 54.
16 European Software Patent Statistic, available at http://eupat.ffii.org/pikta/namcu/.
17 Case T-208/84, VICOM, 1987 E.P.O.R. 74 (EPO Tech. Bd. App. 1986).
18 T 0026/86– 3.4.1.
19 *Pension Benefit Systems P'ship Case,* T 0931/95 - 3.5.1.
20 *Baker* v *Selden,* 1978 AIR 1613.
21 *Whelan Association Inc.* v *Jaslow Dental Laboratory,* 479 U.S. 1031 (1987).
22 *Arnstein* v *Porter*, (1946)154 F.2d 464.
23 *Lotus* v *Paperback*, (1990) 740 F. Supp 37.US District Court.
24 *Apple Computer Inc.* v *Microsoft Corp,* (1994) 35 F. 3d 1435 (9th Cir.).
25 *Computer Associates International* v *Altai,* (1992) 982 F.2d 693 (2d Cir.)
26 *Google* v *Oracle,* 576 U. S. 1071 (2015).
27 https://www.livemint.com/opinion/columns/the-awkward-grant-of-patents-to-artificial-intelligence-11635267216589.html/.
28 https://www.wipo.int/patents/en/topics/utility_models.html.