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Copyright Issues

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ABSTRACT

Libraries and information centres while providing information and document delivery services need to know about the boundary line of rights granted to the copyright holders as well as users of the copyrighted material. The paper discusses ownership issues of copyright, duration of protection, issues related to fair use, and copyright facilitators. The paper also discusses digital technologies and copyright as well as copyright protection technologies. Some of the solutions for various copyright problems have also been proposed.

Keywords: Fair use, DMCA, copyright facilitators, CCC, APS, CLA, CANCOPY, BLDSC, CISTI, ISI, digital signature, watermarking

1. INTRODUCTION

No society can progress without innovation and creativity because social and economic development depends upon the creativity. Creators acquire their intellectual properties after spending a lot of money, time, efforts and energy. To ensure certain minimum safeguards of their rights over their creations, and to provide protection and reward for their creativity, copyright laws were enacted. Thus, the basic objective of enactment of copyright laws is to encourage artists, authors, musicians, database creators, etc. to create original works by rewarding them with the exclusive right for a definite period of time so that they can exploit their work for financial gains. Protection provided to the creators under the copyright laws creates atmosphere conducive to the creativity, which induces creators to create more intellectual properties and also motivates others to put their ideas into tangible form for the further use of the society and the generations to come.

In the absence of copyright laws in a country or weak protection of copyrights, reputed authors of that country might prefer to publish their manuscripts with those publishers in foreign countries where copyright protection is strong. This may ultimately hinder the growth of the indigenous intellectual products of that country. Authors lack infrastructure and are unable to disseminate their work to the public for current and potential use. This breaks the chain between them and the end users. To provide an outward flow of intellectual output to society, there is a need to have an intermediary (publisher), with supportive infrastructure, who can make the intellectual

work in appropriate tangible form for further dissemination. Generally, publishers have adequate infrastructure for mass production and excellent network for distribution. Thus, the authors grant licensing right of their work to a publisher for further distribution. Therefore, most of the creations are a joint effort of the originator and the distributor.

Copyright law makes a balance to provide monetary and social benefits derived from the widespread use of the creative work to both the parties. To promote the progress of science and useful art, an exclusive right is given to the owner of original work to ensure that others do not unlawfully exploit his work.

A creation is protected under copyright laws immediately after it is put in any tangible form, provided that it satisfies the criteria of 'originality' and 'creativity'. It is not necessary that the work should be novel. The criteria of novelty are applicable for protection under the patent laws, whereas, copyright law is applicable to the original and creative work. In case two different authors have created original but identical works without copying their works in existing forms, both are qualified for the copyright protection provided their works have substantial creativity.

A work can be original without being novel or unique. Thus, to qualify for the protection under the copyright laws, a work must be fixed in a tangible medium of expression, should be original, and a result of at least some creative efforts.

The term 'originality' has not been defined in copyright laws and has been interpreted differently in the court of law on case to case basis. Originality requires a creator to contribute something more than a 'merely trivial' variation which is recognisably 'his own'. A work will be considered 'original' if it owes its origin to the author and was not copied from some preexisting work. A work is "fixed" when it is made "sufficiently permanent or stable to permit it to be perceived, reproduced, or otherwise communicated for a period of more than transitory duration". Copyright only protects the expression of an idea, not the idea as such.

2. OWNERSHIP ISSUES

The owner may be an author, an artist, a painter, a composer, a photographer, a producer, an engraver or architect, a computer scientist or a programmer. In case a person, if delivers any lecture/address/speech in public, then he or she shall be the first owner of that lecture/address/speech. In case a person has delivered/addressed speech on behalf of another person, such person shall be the first owner of the copyright irrespective of who has delivered or addressed his speech on his behalf. In case of a government work, the government shall be the owner of copyright. The owner may also be the performer, which includes an actor, musician, singer, choreographer, juggler, acrobat, snake charmer, etc.

There is a strong debate on the ownership of copyright in which owner invests money and energy to make knowledge in tangible form. The owner makes knowledge costlier, which adversely affects the progress of the society. Since prime objective of copyright is both to reward the creator and development of the society, technology may be helpful in closing the wide gap between haves and have-nots, particularly in India.

The conflict between the copyright owners and the users is continuously growing as the cost of storage and processing devices is decreasing and the availability of digital technologies within the reach of common man is increasing. Legislature and judiciary need to retool copyright laws to make balance between the rights of the owners and the interest of the users. Copyright owners are concerned about losing control over their work in digitised form and also fear that their monetary gain would be minimised. At the same time users are afraid that they have to take permission for each and every digitised work before using it.

If an employee of an organisation creates the work within the scope of his employment as a part of his official duties, the copyright vests with the employer. It may be argued by the employee that the work was created after the office hours of employment; therefore

he is the rightful owner of the copyright. A dishonest employee may be able to blackmail the employer. There are methods whereby such malicious claims of employees can be avoided. For instance, it should be provided in an agreement with the employee that if he creates work other than in the course of his employment, a written intimation of the same must be given by him to the employer within a stipulated period. If he fails to do so it shall be deemed that such a work was done by the employee during the course of his employment with the employer. The following is a sample clause which could be used as guidance in the employment contract, so as to protect the copyright ownership of the employer and to obviate malicious and false claims of an employee to the effect that he has done the work outside the course of employment:

"If during the period of your employment, you initiate or make any endeavour to create any intellectual property after office hours or outside the scope of your employment, you shall intimate this fact in writing to the employer company within three days of such initiation or endeavour. Similarly on the creation of any intellectual property, you shall give a written intimation of this fact to the company within three days of such completion. On intimation, the company shall consider your claim and would intimate you in writing as to its opinion regarding the same. If the company is of the opinion that your claim is justified it shall accept the same and put it on record. In the event of any dispute between your claim and the company, it shall be resolved through arbitration by the arbitrator, namely (name of the arbitrator). The arbitrator shall decide the issue/dispute in accordance with the law. In the event of your not sending intimation within the stipulated time frame in terms of the instant clause to the company, this shall be an evidence and an admission on after your part that no intellectual property has been generated or developed by you after office hours or outside the employment of the company and the intellectual property, in dispute, shall be treated as the ownership of the company".

If the work has been created by more than one person and any of them happens to be the employee of a company or organization, the copyright will be jointly with the company and other contributors.

A researcher, after completing his research work submits his thesis to his University for the award of degree. On the basis of evaluation of thesis and some other requirements, the researcher is awarded degree. Now the question comes that who is the first owner of the copyright, researcher or the university? Copyright laws do not provide any clear-cut guidelines in this regard. In case researcher desires to publish his thesis or gives it to the University of Microfilm International (UMI) for further dissemination, the safe way for him will be to seek permission from the university with whom he is registered to avoid any legal problems in future.

3. DURATION OF PROTECTION

Any work in public domain and the work for which the copyright has expired, can be copied by any person freely and without the permission of the owner. In India literary, artistic, dramatic and musical work of a single author is protected during the lifetime of the author and sixty years after his/her death. In case of joint authorship, it is protected during the lifetime of both authors and up to fifty years after the death of the last surviving author.

According to the US copyright laws[1], if a work was produced prior to 1 January 1978, it is generally unprotected unless it bears a copyright symbol ©. A copyright notice/statement is not required for the work published after 1 March 1988, though the owners put it as a precautionary measure for protection against infringement. The work created before but not published before 1978 has especial rules. For the work created and first published between 1950 and 1978 the copyright lasts for 95 years after publication. For the works created and first published before 1950, the copyright lasts for 28 years but can be renewed for another 67 years.

For works created on or after 1 January 1978, copyright protection is valid from the moment of its creation until the death of the author plus 70 years. In case of a "work for hire", the protection is valid for a period of 120 years from the date of its creation or 95 years from the date of first publication, whichever expires first. Most often, the work for hire is created in the context of an employment situation, where the employer also qualifies as the author of the work created by an employee within the scope of his or her employment. Since the terms of protection of copyright varies with the amendment of copyright, which frequently takes place, it is better to seek the help of the US Copyright Office to check the exact status of the copyright of the works created by the US authors after 1920.

4. ISSUES RELATED TO FAIR USE

Fair use has been traditionally defined as a privilege to those other than the owner of the copyright to use the copyrighted material in a reasonable manner without the consent of the owner. It is associated with the nature of work, quantity, proportion of the work to be copied, purpose, intention and motive of the use as well as economic impact on the owner's work.

Librarians and information professionals, while providing the services to the users, sometimes infringe the copyrights. They generally provide photocopies of documents to the users. Sometimes, this requires permission from the copyright holder. It may not always be possible to approach the owner due to various reasons. Even the intentions of libraries are not to make profit out of it, but they have no physical control over the user who has taken the copy.

Fair use provisions have been made in the Indian Copyright Act[2] 1957 Chapter XI Clause 52. In its original text, not much emphasis was given to digitally stored information because there was not much usage of electronic technology at that time. However, after amendments, Section 65 A included provisions of anti-circumvention measures. Many developed countries have amended their Copyright Acts to suit current requirements to accommodate latest technological developments and their impact on copyright. The US government passed Digital Millennium Copyright Act[3] (DMCA) in October 1998 (effective from October 2000). Chapter 12 of DMCA deals with copyright protection and management issues. Its Clause 1201 subclause (a) deals with violations regarding circumvention of technological measures; subclause (f) on reverse engineering; and subclause (g) on encryption research and permissible activities. However, Clause 1201 subclause (d) grants exemption for nonprofit libraries, archives, and educational institutions. It states:

"A nonprofit library, archive or educational institution, which gains access to a commercially exploited copyrighted work solely in order to make a good faith determination of whether to acquire a copy of that work for the sole purpose of engaging in conduct permitted under this title shall not be in violation of Section 1201 (a) (1) (A)".

The exemption made available through the Clause 1201 subclause (d) shall only apply with respect to a work when an identical copy of that work is not reasonably available in another form. In case a nonprofit library, archive or educational institution that willfully for the purpose of commercial advantage or financial gain violates above paragraph, then it shall, for the first offense, be subject to the civil remedies and shall for repeated or subsequent offenses, in addition to the civil remedies, forfeit the exemption provided above. This exemption can not be used for defence purposes.

This Clause does not permits a nonprofit library, archive or educational institution to manufacture, import, offer to the public, provide or otherwise traffic in any technology, product, service, component or part thereof, which circumvents a technological measure. In order to qualify for the exemption under this Clause, the collections of that library or archive need to be open to the public or available not only to researchers affiliated with the library or archive or with the institution of which it is a part, but also to other persons doing research in specialised fields.

The European Union (EU) Directive[4] on the Legal Protection of Databases was adopted on 11 March 1996. Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Netherlands, Portugal, Spain, Sweden and the United Kingdom are the signatories to this Directive. There are two basic objectives of the Directive:

- To harmonise copyright laws applicable to the structure of the databases, and
- To create a new Sui Generis right which protects the database makers against the unauthorised extraction and/or reutilisation of the whole or a substantial part of their databases?

Under the Article 5 of the EU Directive, the author of the database has been given the following exclusive rights to carry out or to authorise:

- Temporary or permanent reproduction.
- Transmission, adaptation, arrangement, and any other alteration.
- Distribution to the pubic.
- Communication, display or performance to the public.
- Reproduction, distribution, communication, display or performance to the public, translation, adaptation, arrangement or other alteration.

Article 7 of the EU Directive creates a new proprietary right for database, namely, the *sui generis* right in which the database makers will have the right to prevent acts of extraction and/or reutilisation of the whole or a substantial part of the database. Under the Directive the database maker has been defined as the person who takes the initiative and the risk of investing in the creation of the database.

The European Union Directive on Copyright and Related Rights in the Information Society was approved in May 2001. It entered into force on 22 June 2001. The provision was made to prohibit the making of copyrighted work available on Internet unless authorised by the right holder. It has also made provision that the member states shall protect against circumvention of and using devices to circumvent technology measures that ensure rights, except in the case of libraries, educational institutions, teaching and research organisations, disabled persons, and public security. The main objective of the directive was to harmonise the law throughout the member states. Article 6.2 of the Directive does not only prohibits the personal act of circumventing the technological measures, but also the preparatory activities. Similarly Article 6.3 of the Directive states that:

"Any technology, device or component that, in the normal course of its operation, is designed to prevent or restrict acts, in respect of work or other subject matter, which are not authorised by the right holder of any copyright or any right related to copyright as provided for by law or the Sui Generis right provided in the Directive 96/9/EC".

The Australian Copyright Act[5] 1968 was amended in the year 2000 and is known as Australian Copyright Amendment (Digital Agenda) Act 2000. It came into effect on 4 March 2001. According to the Amended Act: A device or product, or a component incorporated into a process, that is designed, in the ordinary course of its operation, to prevent or inhibit the infringement of copyright in a work or other subject matter by either or both of the following means:

- By ensuring that access to the work or other subject matter is available solely by use of an access code or process (including decryption, unscrambling or other transformation of the work or other subject matter) with the authority of the owner or licensee of the copyright.
- Through a copy control mechanism.

This Law does not prohibits the act of circumvention itself, but only the preparatory acts, distinguishing between devices and services. The following actions are prohibited:

- Making the devices, selling, letting for hire. Offering or exposing for sale or

hire, promoting advertising or marketing the device.

- Distributing the device for the purpose of trade, or for any other purpose that will prejudicially affect the copyright owner.
- Exhibiting the device in public by way of trade.
- Importing the device for certain commercial purposes.
- Making the device available online to an extent that will prejudicially affect the copyright owner.

5. COPYRIGHT FACILITATORS

To overcome the problems of granting licenses to the users or documents suppliers, to collect copyright fees from the end users and to distribute royalties to the actual owners of the copyright, etc. there is a need to establish copyright facilitating agencies in each country. These agencies can work as switching system among users, documents suppliers and copyright owners. Some of the western countries have already established copyright licensing agencies in this regard. The functions of these agencies are to negotiate fees with the copyright holders, i.e., publishers, authors, etc. and charge the copyright fees from the users either directly or through clearing houses. The following are some of the major licensing agencies worldwide:

5.1 Copyright Licensing Agencies

5.1.1 Copyright Clearance Centre, USA

To use and share the published content with ease and confidence, at the suggestion of the US Congress, a not-for-profit organisation namely, Copyright Clearance Centre[6] (CCC) was founded in 1978. It is a member of the International Federation of Reproduction Right Organisation (IFRRO). It helps in creating global system for licensed content use through agreements with other Reproduction Right Organisations. The CCC is playing vital role in knowledge economy through encouragement of free flow of knowledge with due respect to copyright. It functions as intermediary between the rights of the holders and the users. It also facilitates and empowers academic and professional institutions to lawfully use the copyright protected information. It has distributed millions of dollar as royalties to authors of books and contributors to professional journals. The CCC charges a nominal service fee for each work. The copyright holders are required to fill in a Rights Holder Authorisation Agreement with CCC. The CCC offers the following four types of services to its users.

- *Academic Permissions Service (APS):* On behalf of the copyrights holders, CCC grants permission to academic institutions, academicians and bookshops for photocopying of copyrighted materials for their use in the courses or classroom handouts. The royalty as set by the rights holders, is collected from the users.
- *Electronic Course Content Service (ECCS):* Permission is granted by the CCC to the users for the digital use of copyrighted material for storage in electronic form, course material in electronic form through a protected password. This password is issued for a limited period of time.
- *Transactional Reporting Service (TRS):* The CCC grants instant permission to libraries, information centres, document delivery centres, document suppliers, photocopying shops, information providers, individuals or organisations involved in information dissemination and document supply activities. It collects royalty fees as set by the copyrights holders.
- *Foreign Authorisation Service (FAS):* Royalties collected for the photocopying of the US work in foreign countries is distributed by the CCC under this service.

5.1.2 Copyright Licensing Agency, UK

The Copyright Licensing Agency[7] (CLA) grants licenses on behalf of the copyright owners and offers a range of licenses to copy onto and from paper and also electronic copying. It does not store and deliver documents to the end users. It provides means for the owners to earn a living by creating their

works in tangible form. The CLA play significant role in maintaining the value of their work and its benefits to the society. It grants licenses to all organisations including businesses, charities, public bodies, academic and professional bodies, government departments, etc. It issues licenses to institutions for low volume document delivery (limited to 100 copies per month), transactional document delivery (unlimited), and press cutting agency license. It also acts as an agent of the CCC.

5.1.3 Canadian Copyright Licensing Agency (CANCOPY), Canada

The Canadian Copyright Licensing Agency[8] (CANCOPY) is a nonprofit organisation established by the publishers and writers. Basic objective of the CANCOPY is to make safeguard for the reproduction right and the copyright. It authorises and issues the licenses to use copyrighted material, collects royalties and distributes to the owners of copyright. It also receives royalties from the government of Canada for the copies made within the Canadian government.

The CANCOPY distributes royalties to the 'Copyright Collective in the Province of Quebec' (COPIBEC) or CCC or other agencies, which further pay the royalties to the right holders. The CANCOPY represents more than 3000 Canadian copyright holders including writers, publishers as well as other foreign authors and publishers. It is also a member of the International Federation of Reproduction Rights Organisation (FRRO) and has made agreements with other similar organisations. Its functions are almost similar to the functions of the CCC.

5.2 Copyright Clearing Houses/ Documents Suppliers

The publishers and licensing agencies mutually establish the royalty fees distribution to the right holders by the clearing houses or documents suppliers. There are a large number of document suppliers and clearing houses all over the world. Individuals, libraries and information centres are getting documents through these sources. Some of the major centres are mentioned below.

5.2.1 The British Library Document Supply Centre

The British Library Document Supply Centre[9] (BLDSC), an organ of British Library, subscribes approximately 45,000 titles of journals with total collection of over 2,50,000 titles. The BLDSC has direct agreement with the rights holders and also with the CLA. It holds license from the CLA, which allows it to make copies beyond the limit of the provisions for libraries in return for the payment of royalties set by the copyright owners. The BLDSC makes payment to the right holders and also to the CLA on quarterly basis.

5.2.2 Canada Institute for Scientific and Technical Information (CISTI)

The CISTI[10] has direct agreement with the publishers. The Canadian clientele indirectly pay royalty fees through taxation, whereas, citizen of other countries are charged fees as established by the CCC. It has different rates for pre-1996 articles, 1997 articles, 1998 and current articles.

5.2.3 Institute for Scientific Information (ISI) Document Solution

The ISI[11] either directly pays royalties to the publishers or through the CCC. The amount of the royalties varies from publisher to publisher and is paid on quarterly basis. It charges, in general, the actual fees charged by the copyright owners and 20 per cent as processing fee for each item excluding mailing and extra expenses.

5.2.4 UMI Info Store

The UMI directly negotiates and licenses with the publishers about the royalties. Out of its 20,000 titles, most of the items are supplied against standard royalty fee per item. The royalty is distributed to the publishers on half-yearly basis. However, smaller publishers are paid on annually basis. While most of the publishers are paid directly by the UMI, a few are paid through CCC.

5.2.5 Uncover

It maintains database of journal articles, which can be searched by the users directly.

Article-specific royalty is charged by the users and paid to the owners of the copyright. There is no uniform charges from the users for the articles published by different publishers.

6. DIGITAL TECHNOLOGIES AND COPYRIGHT

Digital technologies are coming up very fast. It may be difficult to forecast about the digital technology that will come up in the future. It would be appropriate if the copyright law is modified to address the issues of protection of exclusive rights of the creators as soon as new technology is emerged. Remedial measures in the law with interpretation in a positive manner should provide protection by broad statement, which would cover all aspects of copyright. While making the draft during the amendment in the Act, expert opinion of the specialists in the respective areas should be considered to accommodate implications of emerging technologies on the Act.

Digital technology has created very serious problems to the copyrighted material on one hand and provided many opportunities for its exploitation on the other. Creators are under the grip of fear that digital world would end the protection of their exclusive rights because every body will copy every thing freely and there would be no more creative work. Every time digital technology comes up with methods of better reproduction, the copyists make efforts to free-ride on the labour of others. Policy makers need to come up with solutions to curb this practice by providing stricter measures to curb copyright infringement and protect the rights of the creators.

Rapid development of digital technology has led to the new dimensions in storage, retrieval and dissemination of knowledge. It has also opened new avenues and opportunities for the content creators for dissemination of their work as well as to users who utilise these works through a variety of modes of communication. While on one side, these technologies are available to the users round-the-clock, which they can access within a very short duration of time and in a very convenient way, on the other side, these posed challenges to the copyright protectors, i.e., lawmakers like, parliamentarians, legislature and judiciaries; law enforcement agencies like police, etc. These problems are the outcome of the followings:

- Duplication of copyrighted work is quite easy and comparatively less expensive.
- Quality of copies of copyrighted work is almost similar to the original and difficult to differentiate from the originals.
- Distribution of the copyrighted works can be made to a number of users simultaneously and instantly, irrespective of their geographical locations.

The following factors have affected the copyright in digitised environment:

- Simplification of reproducibility.
- Advancement in technology for compression and storage of digital content.
- Easy extraction of digital contents from storage media.
- Reduction in cost of reproduction.
- Easy substitutability of digitised copies.
- Easy communication of digital content over Internet.
- Inexpensive dissemination of digitised products.

Due to emergence of the consumer electronic devices, computers, satellite communication systems, optical fibre communication and global networks, the process of protection of copyrights has become more complicated. As the cost of reproduction and distribution of creative work in digital form continue to fall, copyrighted material can be made available to the users at a very low marginal cost. In the western countries, the law makers, content creators, manufacturers of consumer electronics including software and hardware, have already faced these challenges. On various forums, they had discussed the implications of these technologies on copyright issues and amended their national laws to suite the present scenario, because they found out that neither legal protection nor technological measures could alone provide

perfect remedial solutions for these problems. Only cooperation and compromise among the content creators, manufacturers of consumer electronics and other related technologies will help in effective implementation of the copyright protection.

Certain things like words, names, titles and slogans, ideas, procedures, processes, systems, principles, discoveries, regardless in the form they have been described, explained, or illustrated are not subject to copyright, but the particular manner in which they are expressed or described may be protected under the copyright law.

7. COPYRIGHT PROTECTION TECHNOLOGIES

Besides protecting the rights of the owners of copyrighted material in electronic environment, it is also important that the information concerning the copy protection status of a particular piece of content be conveyed accurately and securely. Information should qualify two basic requirements: authentication—information sent by the issuer is accurate and reliable, and integrity—it has not been modified or altered during the transfer. As a result, the following approaches for conveying copy protection information have been developed:

7.1 Secure Digital Transmission Copy Protection

In this system, if someone attempts to manipulate the copy protection information, the keys for the content will be altered, and the content itself will become inaccessible. This system has the following advantages:

- The information is secured from any outside interference if someone attempts to modify it.
- The information is reliable at the receiving end.
- The information is convenient because it is the part of the security system itself.

The copy protection information has been categorised into the following two categories:

7.1.1 Digital Signature

In literary terms, signature is defined as the action of signing one's name, initials or distinctive mark to authenticate the genuineness of a document. In legal terms, signature is a piece of writing by which a person identifies itself in an act and by which the person expresses its approval of the content of the document. In other words, it is a kind of any sign bound to a contract allowing identification and authentication of the document's signatory and showing the intent to agree to the document's content. Thus, the role of a signature can be summarised as: expressing intention to be bound to a contract, to identify the parties, and to authenticate the document. Traditional signature can be easily produced and recognised but difficult to forge. It becomes physical component of the document and hence it is difficult to remove without trace.

Fast growing digital technology and Internet, has necessitated the need of digital signatures[12] (also known as electronic signature or e-signature) in place of conventional signatures. Digital signature offers secure and trustworthy solutions, authentication and integrity of the document as well as identity of the sender. It is an electronic data attached to or logically associated with other electronic data, and serves as a method of authentication. In present context, prints of unique body parts (fingerprints, eyes, ears, etc.) are used to recognise individual's identity to access information or money transaction from banks. It is used to study the resemblances between living things and statistical methods, and is also known as biometry, i.e., application of mathematics to biology. Digital signature is currently the most appropriate form to fulfil the requirements for technological protection of copyrighted material in electronic environment.

Digital signature can be described by the process of encryption and decryption technology known as cryptography. In this process, information (plain text) is passed through an encryption process to produce an encrypted copy (cipher text) that is further decrypted and restored to the original plain

text through the application of the cipher key. The concept behind this is to make the data illegible for everyone else except those specified. In this mechanism information is transformed from one place to the other that only sender and recipient can see. The system is based on application of mathematical keys in symmetric and asymmetric algorithms, known as conventional/symmetric cryptography and asymmetric cryptography[13]. The keys are delivered to the authorised users and/ or authorised equipment. Symmetric cryptography requires that the same secret key is shared to encrypt and decrypt the electronic copyrighted material.

Encryption/decryption is a popular means of protecting communication transmitted through a potentially hostile environment such as computer network. Encryption protects the content until it is decrypted at which point it can be copied on to other media. If a person needs to send an electronic copyrighted material to another person, both need to know the secret key in advance. After the receipt of the material, the receiver has to decrypt it using symmetric algorithms to access the original material.

One of the major disadvantages in this system is that if several recipients exist, the sharing of same secret key may violate the principle of secrecy. Therefore, asymmetric cryptography is more suitable in case of open network environment. In this system, two different, interdependent keys, public and private key, are used. Private key is kept at a secure place by the sender, whereas, public key can be distributed to the receivers. In this process, if a person wants to send an electronic copyrighted material to the user, the sender encrypts the original material using asymmetric algorithms. User receives the public key from the sender and decrypts the material to obtain the original material. The material that has been signed, using the private key, can only be verified by the use of the public key and vice versa. This ensures the integrity and authentication of the original material. The copyrighted material is transmitted in an encrypted form in a software envelope which is further decrypted at the user's end. For databases, the software envelope permits user to search indexes and display text. For video information, the software envelope permits display of the video. For textual information software envelope allows user to display text and open pages. These are some of the ways how software envelope can control the copyrighted materials.

7.1.2 Watermarking Technology

Watermarking is a technique for impressing a design onto the fibre of the paper during its manufacturing process. It has been well known since the manufacturing of paper was started. In this technique, high pressure is put on wet fibre, through some defined pattern, to expel the moisture and to leave an imprint on the paper. It is known as watermark and can be viewed under transmitted light. It is a part of "Steganography", which literally means "cover writing". "Stega" is a Greek word which means "to cover". Now, the word "watermarking"[14], has been replaced with "digital watermarking", because it can be applied to other forms of digital data like text, images, and even sound also. The versatility of digital watermarking technology has attracted intellectual property owners to apply it on their products to secure digital transmission. Digital watermarking differs from the printed watermarking because it uses naturally occurring variations of text and images, and thus can not be seen by the user unless special techniques are employed. In case of an image, watermark can be embedded into an electronic image by slightly changing the brightness of some of its pixels in a regular or even random patterns. It can also be done in the text by making variations through creating spaces between lines and characters.

Similarly, watermarking software can disperse messages throughout the audio file that can be read by a computer only and not by the human ears. The "data hiding" and "information hiding" are also other relevant terms often used for the digital watermarking. Digital watermarking is one of a triad of technologies (the other two being encryption and digital signatures), that together offer a reasonable level of copyright protection.

Digital watermarking has a number of advantages including copyright protection of electronic copyrighted material on Internet, finding out unauthorised reproduction of images, dissuasion of potential pirates, etc. Though, it does not prevent unauthorised copying, but unauthorised distribution of copyrighted material can be traced or detected. One of the major application of the digital watermarking is to convey the 'ownership information'. There may be person who may try to fiddle with the copyrighted material by removing the ownership information. The watermark may either identify the originator of the copyrighted material, or it may identify the recipient, i.e., the end-user to whom the material was delivered. The watermark may be visible or invisible. The invisible watermarks are embedded in the material together with associated information, e.g., its name, its author, its date, its point of contact, etc.

Several inventors have proposed using ownership watermarks to authenticate the material. Most invisible watermarks are designed to be robust; the watermark robustly survives alterations of the watermarked data.

Recently, with the advent of digital movies on satellite broadcasts and DVD media, the movie studios have become very interested in watermarking. The application here is to record an invisible, robust, "never copy", "copy once", or "no more copy" watermarks in each movie. Every recording device will be required to detect them, and refuse to record any movie whose mark prohibits copying. In return, the studios would indemnify the recording device manufacturers against contributory copyright infringement suits. The largest advantage of this watermarking application is the independence from the technology, protocol, or format of the distribution. Some of the watermarking technologies have been described here:

Visible Image Watermarks: It is available with IBM Digital Library. It embeds a visible mark onto a gray or color photographic image. This watermark has several features that distinguish it from other visible watermarking techniques. One constrains the watermarking process to change only the brightness, and not the colour, of the image to be marked this is intended to make the watermark less obtrusive.

Reversible Visible Watermarks: It is developed at the IBM Tokyo Research Laboratory for applications such as online content distribution. Here, the image is marked with a Reversible Visible Watermark before distribution or posting on the Internet, and the watermarked image content serves as a "teaser" that users may view or obtain for free. Then, the watermark can be removed to recreate the unmarked image by using a "vaccine" program.

Fragile Image Watermarks: IBM is investigating multiple techniques for fragile image watermarking that would determine whether an image has been altered since the time when it was watermarked. The targeted applications for this "image authentication" include detection of altered (or replaced) image content within a digital library, and the "secure digital camera."

Robust Image Watermarks: IBM is also investigating multiple techniques for robust image watermarking that would apply watermarks that could later help in identifying the owner or recipient of an image. This technique requires an image-specific watermark key to extract the watermark from the watermarked image. This makes it more difficult for a malicious party to detect or estimate the watermark (which could lead to it being removed to delete evidence of ownership).

8. CONCLUSION

Law can not keep pace with technology. All efforts need to be made to amend copyright laws to cover technological impact on the associated legal issues. Law makers, judiciary, law enforcement agencies, scientists, technologists, technology forecasters, users, etc. should join hands together to include latest provision for the protection of copyright and make safeguard for the interest of the users.

There is a need to establish an agency in India on the same way as in the USA, the UK and Canada. On the pattern of licensing agencies like CCC, CLA and CANCOPY, India should also have a mechanism of licensing agency for granting licenses of copyright.

Similarly, we should also establish a national centre/clearing house for supply of documents to the end users.

An Act should be passed to establish a Copyright Clearing Agency in India with latest information and communication technologies and skilled and professional manpower to facilitate users of copyrighted material. The government should work as a facilitator between users and copyrights holders. The government should collect fees from the users and distribute royalties to the owners after charging a nominal service charge. Some efforts have already been made to constitute a Copyright Clearing Agency of India (CCAI), which will grant license to the users on behalf of the rights holders. This can help in minimising the problem of infringement of copyrights up to some extent.

Sometimes individuals are not familiar with copyright laws and the kinds of activities which do not come under the fair use doctrine. Users can be made aware of the rights of the users and rights of the owner to avoid any legal conflict between these two.

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"We should respect the rights of others the same way we want our rights respected"