DFilm Convention 2000

Digital Dreams DFilm Convention, is the title of the international symposium organised by IFEA (International Film Event Arnhem) and will be held in spring of the year 2000 in Arnhem.

Digital Film Center Europe (DFC EU) started its operations in April 1997. In co-operation with an international consortium of companies and institutions, and supported by European Commission funding, DFC EU developed a databank with digitised film materials. The databank comprises actual movies, film archive materials, television programmes, documentaries, commercials, company films and historical material going back to the turn of the 20th century. The databank not only allows preservation of film but also offers data handling services for easier access. This makes repackaging of data possible and applications in formats like DVB, DVD, Digital Cinema and Internet-2.

Handling of digital audio-visual material requires expertise, skills and human labour. The development of digital media therefore is of great importance for the Gelderland regional employment. Digital film activities created a clear and innovative surplus for the regional cultural industry. The thousands of hours of audio-visual material already availableare used to illustrate educational materials, to produce documentaries and to enhance multimedia applications. The demand for audio-visual content will be concentrated on these market developments for the years to come.

Institutions such as museums, archives, libraries and academies aware of this trend, are looking for co-operation. Digital technology enables easy content handling. Materials provided with digital images can be transformed into enriched information products. Also businesses are confronted with the new media development. New information products can be made by the publishing industry and new business opportunities arise.

At Digital Dreams DFilm Convention, international speakers from the world of digital film will discuss film-archives, film-restoration, 3D-animation, cyber-cinema and Internet. Representatives of the municipality of Arnhem, the Ministry of Economic affairs and venture capitalists will give their opinion on the perspectives of the image-industry and the importance of the industry for the region. In addition speakers and lecturers from Tblisi Georgia, Hollywood USA, Melbourne Australia and many more European countries will provide the Digital Dreams Dfilm Convention with a global view on digital film.

Many demonstrations will take place and it wouldn't be a digital film convention without digital materials being shown. The participants can enjoy a movie from a growing film country like Greece and a movie from a country with a long film history like Georgia. The famous Georgian director Eldar Shengelaia will present his movie 'Blue Mountains' in digital format.

Spring 2000 in Arnhem holds a promise for a very special day. A day on which the future of Digital Film can be seen!

annotation

In the information industry various definitions are in use.
Data are the bits and bytes to construct digital information.
Information is: answer to a question. (*definition of H.P.Bull)*
Communication is: exchange of information.
Metadata can describe a wide range of information-elements.
Metadata are in fact data about data.

Metadata accompany well-managed data-repositories. Since computers are powerful enough to store large amounts of data, data-repositories also contain audio-visual data. Metadata facilitate usage and application of audio-visual content and can make digital content more attractive. By writing annotations, special information is added to (digitised) film parts. The annotation process is an enrichment, value added information. The process enhances the representation of digital content in user environments and improves exploitation perpectives. Annotations provide the basics to rapidly develop thematic audio-visual information products, tailored to the specific needs and requirements of information consumers.

Compression

Compression is storing data in a format that requires less space than usual. *Compressing* data is the same as *packing* data. Data compression is particularly useful in communications because it enables devices to transmit the same amount of data in fewer bits.

There are a variety of data compression techniques, but only a few have been standardized. The CCITT has defined a standard data compression technique for transmitting faxes (Group 3 standard) and a compression standard for data communications through modems (CCITT V.42*bis*). In addition, there are file compression formats, such as ARC and ZIP. Data compression is also widely used in backup utilities , spreadsheet applications, and database management systems. Certain types of data, such as bit-mapped graphics, can be compressed to a small fraction of their normal size.

Compression is a process of reducing the number of bits required to represent some information, usually to reduce the time or cost of storing or transmitting it.

Some methods can be reversed to reconstruct the original data exactly (*lossless data compression*); these are used for faxes, programs and most computer data.

Other methods (*lossy data compression*) do not exactly reproduce the original data, but this may be acceptable (for example, it is probably good enough for a video conference, and not having to travel is appreciated). In addition, the

reduction in image quality may be imperceptible; many voice and video compression schemes eliminate parts of the signal (for example, the phase relationship between frequencies) that are not discernible to people.

Video compression

Data compression is used mostly to handle data in formats that tend to consume large amount of storage or channel capacity: in particular images, sound and video.
Data (images, video, etc.) is compressed by special programs called data compression software. When compressed data is retrieved from a disk or received at the reception end of a channel it is decompressed by similar software.
Uncompressed video and audio data are huge. In HDTV, the bit rate easily exceeds 1 Gbps. This causes problems for storage and network communications.
The *compression ratio* of lossless methods (e.g., Huffman, Arithmetic, LZW) is not high enough for image and video compression, especially when distribution of pixel values is relatively flat.
The following compression techniques will be discussed: Spatial Redundancy Removal, Intraframe coding (JPEG), and Spatial and temporal Redundancy Removal, Intraframe and Interframe coding (MPEG).

What is MPEG?

The international organisation for standardisation coding of moving pictures and audio has developed standards for compression, decompression and processing of encoded formats of audio and film materials. MPEG ('Moving Picture Experts Group') uses as one-liner: 'specifying the minimum for maximum usability'.
Untill today the following standards have been developed:

- MPEG-1, a standard for storage of moving image and audio in information carriers
- MPEG-2, a standard for digital television

MPEG-1 is a standard for storage and use of moving image and audio fragments in storage systems. MPEG-1 exists of decoders and encoders.
Coding of moving pictures and associated audio for digital storage media combines one or more data streams from the video and audio parts with timing information to form a single stream. This is an important function because, once combined into a single stream, the data are in a form well suited to digital storage or transmission.
A number of techniques are used to achieve a high compression ratio. The first is to select an appropriate spatial resolution for the signal. The algorithm then uses block-based motion compensation to reduce the temporal redundancy. Motion compensation is used for causal prediction of the current picture from a previous picture, for non-causal prediction of the current picture from a future picture, or for interpolative prediction from past and future pictures. The difference signal, the prediction error, is further compressed using the discrete cosine transform (DCT) to remove spatial correlation and is then quantised. Finally, the motion vectors are combined with the DCT information, and coded using variable length codes.
MPEG-2 addresses the combining of one or more elementary streams of video and audio, as well as, other data into single or multiple streams which are suitable for storage or transmission. This is specified in two forms: the Program Stream and the Transport Stream. Each is optimised for a different set of applications.
The Program Stream is similar to MPEG-1 Systems Multiplex. It results from combining one or more Packetised Elementary Streams (PES), which have a common time base, into a single stream. The Program Stream is designed for use in relatively error-free environments and is suitable for applications which may involve software processing. Program stream packets may be of variable and relatively great length.
The Transport Stream combines one or more Packetized Elementary Streams (PES) with one or more independent time bases into a single stream. Elementary streams sharing a common timebase form a program. The Transport Stream is designed for use in environments where errors are likely, such as storage or transmission in lossy or noisy media. Transport stream packets are 188 bytes long.
MPEG-2 also builds on the powerful video compression capabilities of the MPEG-1 standard to offer a wide range of coding tools. These have been grouped in profiles to offer different functionalities.
Since the final approval of MPEG-2 Video in November 1994, one additional profile has been developed. This uses existing coding tools of MPEG-2 Video but is capable to deal with pictures having a colour resolution of 4:2:2 and a higher bitrate. Even though MPEG-2 Video was not developed having in mind studio applications, a set of comparison tests carried out by MPEG confirmed that MPEG-2 Video was at least good, and in many cases even better than standards or specifications developed for high bitrate or studio applications.
The 4:2:2 profile has been finally approved in January 1996 and is now an integral part of MPEG-2 Video.
The Multiview Profile (MVP) is an additional profile. By using existing MPEG-2 Video coding tools it is possible to encode in an efficient way two video sequences issued from two cameras shooting the same scene with a small angle between them. MPEG-2 is a backwards-compatible multichannel extension of the MPEG-1 Audio standard. MPEG-2 is used widely because of the fact that it is generic.

What is JPEG?

JPEG is a standardized image compression mechanism. JPEG stands for Joint Photographic Experts Group, the original name of the committee that wrote the standard.
JPEG is designed for compressing either full-color or gray-scale images of natural, real-world scenes. It works well on photographs, naturalistic artwork, and similar material; not so well on lettering, simple cartoons, or line drawings. JPEG handles only still images, but there is a related standard called MPEG for motion pictures.

JPEG is "lossy," meaning that the decompressed image isn't quite the same as the one you started with. (There are lossless image compression algorithms, but JPEG achieves much greater compression than is possible with lossless methods.) JPEG is designed to exploit known limitations of the human eye, notably the fact that small color changes are perceived less accurately than small changes in brightness. Thus, JPEG is intended for compressing images that will be looked at by humans. If you plan to machine-analyze your images, the small errors introduced by JPEG may be a problem for you, even if they are invisible to the eye.
A useful property of JPEG is that the degree of lossiness can be varied by adjusting compression parameters. This means that the image maker can trade off file size against output image quality. You can make *extremely* small files if you don't mind poor quality; this is useful for applications such as indexing image archives. Conversely, if you aren't happy with the output quality at the default compression setting, you can jack up the quality until you are satisfied, and accept lesser compression.
Another important aspect of JPEG is that decoders can trade off decoding speed against image quality, by using fast but inaccurate approximations to the required calculations. Some viewers obtain remarkable speedups in this way. (Encoders can also trade accuracy for speed, but there's usually less reason to make such a sacrifice when writing a

Available suppliers:

Quantel
Founded in 1973, Quantel set out to explore the potential of digital technology in television. The company's philosophy was to identify areas of the television production process which could benefit from advanced digital technologies. The results have often entirely changed working practices, providing users with new, more creative and productive ways to get their ideas on-screen. That philosophy still holds true today and has evolved to network Quantel systems with third party systems, to provide the complete solution. This approach has earned Quantel a reputation of excellence through its attention to detail and the production of award-winning, industry standard solution-specific systems.
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Copyright and the World Wide Web

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Introduction

It's 4 am. The soft glow from the screen illuminates Sam Thursday’s face. Sam logs on. Using his ergonomic mouse, he clicks on the Netscape icon. Within seconds, he's connected to the White House. He glances over his shoulder, then turns back to the screen and downloads a document. Sam smiles. It was easy. As Sam steps out of the office into the cold dawn light, he closes the door on the soft hiss of the printer, as page after page of perfect copy slides into the receiver...
Using a browser like Netscape, file transfer and copying is easy. Publishing a web page requires a little more expertise, but as you will have observed, is done by thousands of K-12 students all over the net. And that is an essential difference with today's copying; it's quick, and easy. More. The digitised copy one makes is an exact copy, one that's indistinguishable from the original, to risk being oxymoronic.
Not only are these operations easy, they're exciting. One has the feeling of mastery over technology, of communicating with the world, of being at the leading edge..... Even though I was an enthusiastic reader of Science Fiction for many years, I'm still amazed and excited by the technology. How long was it from the discovery of the paleolithic paintings in the Ardeche caves until pictures were available on the web? I think it was less than a month. Compared with the time from the discovery of the Dead Sea Scrolls until they were available for public scrutiny, (about fourteen years), it's very exciting.
But it's my contention that this very ease and excitement needs to be tempered with some understanding of our obligations and rights in dealing with copyright materials.

Legal Framework

To assist that understanding, I’d like to drag you back from that leading edge for a while, and look at how we got to where we are. Let's look at the rise of laws that protect ownership. In the beginning, those who had the nastiest weapons and the will to use them owned the property. As John Perry Barlow says, *Property was the divine right of thugs.*(1) However, as the merchant and land-owning classes emerged, it became necessary to develop some more equitable ways of resolving property disputes, so that by the late middle ages, enlightened rulers like Henry II of England began to codify the common

law. While the means of acquiring wealth was tied to agricultural pursuits, it was this body of laws which provided the basis for protection of property, i.e., real estate.

With the industrial revolution came change in the needs of property owners to protect a different kind of property. This was an era which produced tools, in other words the means to produce wealth. As tools developed, and it became possible to produce them in quantity, new laws were needed. To quote Barlow again, *Copyright and patent laws were developed in most western countries to encourage the invention of tools - laws devoted to the delicate task of getting mental creations into the world where they could be used- and enter the minds of others - while assuring their creators compensation for the value of their use.* (2)

In earlier times, copying (of any substantiality) was difficult; there were a limited number of ways of copying, all time-consuming and laborious, which yielded copies which were mostly poor replicas of the original, monastic copying and illumination notwithstanding. The very difficulty of copying was a kind of copyright protection in itself. Without the talents and resources of a Gutenberg, it was difficult to make a book. And so, copyright, evolving from the Statute of Anne in 1709 protected the expression of ideas reasonably succesfully for some 250 years. As an aside, prior to the Statute of Anne, the only way an author could make money was by dedicating his work to a famous or wealthy personage, and hope that that personage would be flattered enough to toss the author a bag of gold. Jonathan Swift said "I never had a farthing from my writings." (3) Let me also say that, although the Statute of Anne is seen as the beginnings of copyright law, it did not protect writers, but publishers, and was intended to provide publishing monopolies in an attempt to prevent the publishing of seditious materials - a form of censorship.

As technology continued to develop, the copyright acts of 1911 in Britain and 1968 in Australia survived the advent of the jellypad, the mimeograph, the Gestetner machine, and the spirit duplicator with some equanimity. Even the arrival of the early two-stage thermal photocopier, difficult to operate and producing copies of varying degrees of impermanence, had little impact. And then there began to appear, as Michael Fraser says "like so many Tardises", the plain paper copiers.(4) Copying, and multiple copying at that, became, for the first time, really easy. Up until this time, although the copyright laws had conferred certain exclusive rights on copyright owners, the difficulty of copying had mostly kept it within bounds which did not cause them a great deal of concern. It may well have been the inaction by copyright owners which led to the generally held but erroneous belief, at least in Australia, that any copying "for educational purposes" was permissible. Suffice it to say that the law coped with the technology in this instance, and we now have collecting societies which sample copying and pass on royalties to their members. The development of the videorecorder and the rise of off-air copying for educational use had been dealt with in a similar way in Australia, and some of the other Commonwealth countries, i.e. by voluntary licensing and the formation of a collecting society which represents copyright owners. Laws now protect both authors and publishers.

To return to the present. Copyright is part of a bundle of rights which are loosely referred to as "intellectual property rights". The various associated rights include patents, trademarks, industrial and trade secrets, circuit layouts, registered designs, the duty of fidelity, and confidentiality. Copyright protects "works". These are grouped by category as: literary, dramatic, musical, artistic, film, sound recording, broadcast, and published editions. Computer programmes qualify as "literary works". Certain exclusive rights are granted to the copyright owner in each of these categories.

In Australia, it is not necessary to register copyright, the protection is given automatically (5), once the expression of an idea has been reduced to a material form. This can be as print or handwriting on paper, signals on tape, or, probably of most interest here, entering data via a keyboard. So, materials on the net, of all kinds, e-mail, bulletin boards, gopher files and web pages are just as protected by copyright as printed books.

The United States constitution states that the prime purpose of its copyright law is "to promote the progress of Science and the Useful Arts". The Australian version lacks the poetry of the foregoing, merely stating that the Commonwealth has the power to make laws for the good government of the country, including those relating to patents, copyright and the like. Nevertheless, copyright laws around the world grant to their citizenry certain exclusive rights, and it’s these rights of which we should be aware.

In general terms, the exclusive rights of a copyright owner include the rights to reproduce, publish, perform, broadcast, transmit and make adaptations of a work, and these rights can be sold or transferred to another person. The copyright laws of most countries, however, have what are generally referred to as "fair dealing" or "fair use" clauses, which permit users to copy limited amounts of a work for their own personal research or study. It’s important to understand that the stress in these clauses is on the type of use rather than the amount copied. Too often I am approached by people who assume that using a small quantity of a work for any purpose is "fair dealing" and that they can thus include the small quantity in, for example, a textbook they plan to publish. Once you begin to deal commercially with, or exploit a copyright work, fair dealing goes out the window, and you infringe the copyright in that work. There are other exemptions granted under fair dealing, including news reporting, criticism and review, certain library uses, legal advice and parliamentary uses, but these are not germane to this conference.

There are some materials which are not protected by copyright, either because the copyright has expired or because the author has expressly stated that he or she wishes to place the material in the public domain. The term of copyright protection for most items in Australia is for fifty years from the year in which the author died. Many countries are extending this term of protection to seventy years, and the United States is now considering an extension to 120 years, which will not make the use of copyright materials any easier. Note also that *unpublished* works are protected by copyright, but the protection term does not begin until the material is published, hence there is always a difficulty dealing with unpublished materials.

So, our use of copyright materials is constrained firstly by the exclusive rights of the copyright owner. Because copyright is an economic right, the owner may or may not be the author, as the rights can be sold or assigned to another party. In may cases, the copyright owner of published material will be a publisher, as those of you who have negotiated with journal

editors will know from your own experience. In seeking permission to use the material you require, you will either have to negotiate with the copyright owner, or with a body which represents many copyright owners, such as The Copyright Agency Limited (CAL) in Australia, for print materials, or the Audiovisual Copyright Society (AVCS) for motion picture and television materials, or the Australasian Mechanical Copyright Owners' Society for music. Other countries have similar bodies, such as the Copyright Clearance Center (CCC) for print materials in the United States, and DACS in Europe, which licences the use of artistic works.

Licence Agreements

At this point I'd like to comment that the various rights organisations or collecting societies have been very dilatory in attempting to come to grips with the creation of licence agreements which would permit the digitisation of works. This is no doubt due to the caution of their members who rightly fear the ease of access and difficulty of control that digitisation will create, but it is imperative that we lobby in any way we can for this kind of licensing to be instituted so that we can explore and develop the full potential of the technology.

While it is a relatively simple matter to negotiate a licence to use a copyright work for publication by one of the more traditional methods, creators of multimedia products are reporting a fairly high percentage of refusals when seeking permission to licence the use of works in multimedia productions. It's believed that this is because the technology is so new that many of the copyright owners don't understand what is being asked of them, nor are they clear on what rights they may be relinquishing, and so find it safer and easier to refuse. I suspect that the same will be true, at least for a time, for those requiring permissions to use material on web pages, or for any associated activity such as the creation of electronic databases of text materials for libraries. So it's important, when negotiating permissions, to be very clear about what it is you intend to do with the material, and to make sure that the permission states explicitly what it is that you have permission to do. While talking about obtaining permissions, a frequently asked question is "How long should I spend looking for a copyright owner, at what stage can I give up and use the material anyway?" The answer, unfortunately, is that if you don't have permission, you don't have permission. Don't use the material. I repeat that it's also important for all of us to encourage, in any way we can, the various rights organisations to move towards the licensing of the electronic use of copyright material.

You'll note that I said that obtaining permission from the copyright owner was the first constraint in dealing with copyright materials, and up until recently, this was the only consideration. Now there are over sixtyfive countries which have implemented moral rights legislation, and such legislation is likely to be introduced into Australian law during the life of the current parliament.(6) Unlike copyright, moral rights are not transferrable, they remain with the author, and usually the author's heirs for fifty years from the year in which the author dies. The basic moral rights which are given to authors and creators are:

- The right of integrity; that is the right to object to any distortion, mutilation or other modification which might be prejudicial to the artist's honour or reputation,
- The right of attribution; that is, the right to claim authorship of a work,
- The right to decide when a work will be published, and
- The right to withdraw a work from publication.

A number of European countries also have what is known as the *droit de suite*, which allows creators to benefit from resales of their work. This is not a right that is at present being contemplated by Australian legislators.

While we are not likely to have any great difficulties with the right of attribution in any of our dealings, nor with the rights of publication and withdrawal, the right of integrity may give us pause. An artist may object to having the subtle colours of their work reduced to eight bits, or to the aspect ratio of their picture being changed, or to having the work truncated to fit the particular web page layout being designed. So, within the next year, you may well be having to consider the moral rights of creators when selecting contents for your web pages.

Technology

In my overview of the development of copyright, I stopped at the point where technology had given us the plain paper copier, and although the law and copyright owners have coped with photocopying, in ways I've described, this is old technology, and probably the next photocopier you purchase will have some kind of optical character recognition device on board which will enable you to copy straight to disk. While these devices already exist, in the form of flatbed scanners, they have not yet reached the ubiquity of the photocopier, either in quantity or use.

It's not so very long ago that the first personalised computers began to escape from their laboratories and their white-coated acolytes, and started pushing calculators and typewriters off desks. Their numbers and power seems to increase exponentially - the machine on my desk has more megabytes of RAM than my original XT had space on its HDD. Not content with merely multiplying rapidly, the PC's began to network, until today there are millions with Internet connections, enabling the rapid transfer of information from computer to computer. While this information was limited to what could be entered by way of a keyboard, there were human limiations, and the greater copyright concern remained the photocopier. But nothing stands still.

Scanning technology developed, followed by video and audio capture. Using satellites to aid in the transmission process, it's now theoretically possible to transmit the entire oeuvre of humankind across the globe in 7.5 seconds. And that's a 1992 figure. The Australian National University last year took delivery of a digital storage device capable of storing the entire collection of the Australian National Library.

There are compact discs capable of holding the Encyclopedia Britannica, and more. Multimedia programs store audio, video and text, along with graphics and still photographs. Our web servers carry vast amounts of information in all these formats.
Estimates vary as to how many people are connected via the Internet, but it's safe to say over tweny million. Each one of those people is capable of doing what I described earlier, downloading documents from all sorts of sites. More. Each of those people is capable of retrieving information, changing it, adding to it, copying it, editing it, and redistributing it, without detection, without acknowledgement, and without payment.
John Perry Barlow, in a provocative article in *Wired* magazine entitled "Selling Wine Without Bottles" asserts that the end of our current copyright laws are in sight, because they were developed to cover forms of works which are entirely different from the digitised material which they are now being asked to cope with. He likens the current laws to a leaky, sinking ship, and describes the efforts to keep the craft afloat as taking several forms; frenzied deck chair re-arrangement, stern warnings to the passengers that if the ship goes down they'll face harsh criminal penalties, and serene glassy-eyed denial. (7) Those of you who are familiar with what's been going on around the world in the copyright law arena will be able to think of examples of each of these approaches, particularly if you look at the activities of various self-interest groups as well as law-making bodies.
Barlow, as I said, is provocative, but I am not convinced that the scene is as desperate as he paints it. There is every reason to believe that the technology can be used to control the technology. We are already seeing the beginnings of an internet cash system which is becoming increasingly secure. Recently I visited a web site in the United States called "CD-NOW" (http://cdnow.com). I was looking for a particularly obscure recording of some Central Asian music. The disc was available, and, using my Mastercard, I was able to open an account with the store, order the disc and pay for it. The disc arrived on my desk six days later, - a very satisfactory transaction, if a little expensive on the freight side. So while my transaction may have been for a concrete object, there's no reason why it should not have been for information in the form of digitised text or graphics, and could have been paid for in the same or a similar way. Most of us who've been surfing the net for some years have become used to the sharing of information at no cost. But it is not unreasonable that creators be rewarded for their efforts, and it is becoming increasingly obvious that this will happen, at least where material is accessed from a web server. What controls can be developed to cover the subsequent use of the material is a difficult question, as although copyright laws exist to protect works, it may be difficult for a New Zealand author to detect what is happening to his work in South Africa.
One difficulty which faces users in a "pay for play"situation is browsing. Will the web site offer abstracts of a comprehensive nature to tempt purchasers, will there be software that only becomes active when one downloads? I don't know.

Problems to be solved.

Another problem that has occupied the cni-copyright discussion list (cni-copyright@cni.org) for some time recently has been the question of the legality of including links to another home page from your own web site. If, for instance, you were to create a page of womens' resources on the web, as a student at UCSD has done recently, you would want to include links to many other pages and sites. These would be pointing to information in which you did not own the copyright. Would you then be assisting others to infringe copyright by directing them to sites where they could download information that either the copyright owner did not want distributed or perhaps use it for purposes other than those covered by fair dealing? The discussion became very complex, but the general opinion towards the end was that it was the responsibility of the copyright owners who placed material on a web site to be responsible for the restriction of access if they were concerned about the use of the material. It was also generally agreed that URL's were probably not subject to copyright in themselves, as they could be regarded as facts, and were therefore not copyrightable.
It's probably hardly necessary to point out to you that we are in a time of change and transition. Copyright laws are but one example of laws which are causing problems in dealing with today's mediums. Laws however, take time to change, and fast change may not be beneficial. Change to the law stands a better chance of being workable and equitable if it comes about through the experience of the users of the new technologies, rather than in response to special interest groups who may want only to protect their investments in older technology. This means that the laws may not get any clearer for some time to come, but it's important that the members of the university community have a voice in the making of those changes. Remember that history abounds with examples of inaction leading to loss of liberties. It's also important to be aware that some of the rights granted under copyright law, and I refer particularly to fair dealing or fair use rights, are under attack. The United States Government Green Paper on the NII has proposals which will significantly change fair use laws in that country, as well as other changes which would affect the conduct of research and teaching. The Australian Government has charged its Copyright Law review Committee with investigating the feasibility of significant changes to copyright law, particularly with regard to subsuming the existing exclusive rights into two broad rights, the right of distribution, and the right of transmission. If this change is brought about, the concept of "copy" or "reproduction" becomes much less significant, which is fine if you are a copier, but perhaps not so fine if you are being copied.
The point I wish to belabour is that of the importance of being aware of what's going on, and taking part in the debate so that your views are made known, and considered. Those of you who followed the saga of what is now known as "The West amendment" to the US's Paperwork Reduction Bill will be aware of the power of the net community as a force for political change in the face of special interests.
Not only should we be involved in the debates about change to the laws, we should also be aware of how the decisions of the courts can build up a trend. In the United States there have been a number of cases involving fair use; Texaco, Kinko's, Campbell , which suggest that as the costs of obtaining permission diminish, the right of fair dealing should diminish as

well. I use this as an example, as the same is not at present true for Australia, but there is no doubt that as the net continues to shrink the world, the thinking in one country will influence the legislators of another. Most times have been times of change and uncertainty, but ours is the first generation which has presided over the birth and demise of so many technologies, and while that uncertainty persists as this technology and its related law develops, we need to be using the leverage which the uncertainty gives us to negotiate with copyright owners for the rights we want as cheaply as we can get them. In addition, as copyright owners ourselves, we need to be circumspect as to the rights we sell. Some publishing companies are already writing digital rights into contracts for print publishing, others are assuming they have them for copyrights they held before it was possible to digitise anything and they are digitising material on this basis. Motion picture companies now have contracts which describe "universal" rights, rather than the old "world" rights. Without academic involvement, the debate continues, and not necessarily to our advantage.

Sources of Information

How does one keep up with what's going on? The web itself provides many sources of information; one of the best starting points for a web search is Yahoo,(http://akebono.stanford.edu/yahoo) look under the Law entry, then choose Intellectual Property. This provides links to many sites.
Particularly useful sites include:

- http://www.bocklabs.wisc.edu/ims/writers.html - Database of Published Writers (A way to find copyright owners.)
- http://www.kentlaw.edu/ - Chicago-Kent College of Law - Home Page
- http://www.gsu.edu/~lawadmn/gsulaw - Georgia State - Law Resources
- gopher://arl.cni.org:70/11/scomm - Assoc of Research Libraries
- http://www.next.com.au/creative/ - Creative Nation Cultural Statement
- http://ntiaunix2.ntia.doc.gov:70/1s/virtual/Archives-by-Topic/intellec - Intellectural Property (sic)
- http://noel.pd.org/ - Public Domain Information
- http://www.rutgers.edu/lawschool.html - Rutgers University - Newark: Ackerson Law Library Home Page
- http://fox.ensemble.com:80/wsgr/ - Wilson Sonsini Goodrich & Rosati
- http://debra.dgbt.doc.ca/info-highway/copyright2/report_e.asc -
- Canada Info Highway Council (Documents on proposed changes to Canadian Copyright Law)
- http://sansfoy.hh.lib.umich.edu:80/jep/ - The Journal of Electronic Publishing
- http://www.xmission.com:80/~mgm/gif/ - The GIF Licensing Controversy
- http://www.eff.org/pub/CAF/law/multimedia-handbook - Multimedia Law Manual
- http://acslink.net.au/~tomw/edg1301.html - Managing Electronic Documents
- http://www.eff.org/papers/samuelson.html - Pamela Samuelson’s Comments on the NII
- http://www.dorsai.org:80/p-law - P-LAW Legal Resource Locator
- http://www.eff.org/papers/ipwg.html - NII Report
- http://gold.utsystem.edu/OGC/Intellectual_Property/cprtindx.htm - Copyright Index
- http://cause-www.colorado.edu/ CAUSE

These sites are some which will enable you keep up to date with developments and changes in the copyright and intellectual property debate, as well as providing pointers to platforms where your opinions can be heard. Technology continues to change the way things will be managed; while this paper was being written, news of a software package called "IVY" was received. IVY is a tracking device for music, which will enable copyright owners to monitor the usage of their music on the Internet, so the user pay software continues to develop.

Conclusion

To conclude. Most works with which one deals on the web are copyright. While there is a provision for fair dealing for the purposes of research and study by individuals, caution should be excercised if any other use is contemplated. The wisest course is to negotiate a permission from the owner. If the owner cannot be contacted, and permission is unable to be obtained, then the material should not be used. If you don't have permission, you don't have permission. The technology continues to change, and, increasingly, the ability of our present copyright and other intellectual property-related laws to cope with the technology is being questioned. Powerful self-interest groups are exerting their influence on legislators for changes which will be advantageous to themselves. There is a real danger that your rights for the exchange and use of information will be eroded. There is a need for all of us to be aware of the debate, and to participate. Otherwise the only right we may be left with will be the right to reminisce.

References

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2. Ibid.
3. Swift, J. (May 12, 1735) in a letter to Wm Pulteney, Esq, Dublin
4. Fraser, M. 1991 Colin Simpson Memorial Lecture, CAL, Sydney 1991
5. Commonwealth of Australia The Copyright Act 1968. AGPS Canberra 1994
6. Commonwealth of Australia Discussion Paper - Proposed Moral Rights Legislation for Copyright Creators. Office of Legal Information and Publishing, Canberra 1994.
7. Barlow, J.P. (March 1994) Ibid.

databases

In order to facilitate access to digital audio-visual files it is recommended that files are stored in standard formats such as MPEG, or AVI. Large storage systems, called warehouses or repositories may contain PetaBytes (1000*TeraBytes) of information. Database applications are ubiquitous and since the rise of the network and the distributed client-server sytems as opposite to the mainframe systems, a new perspective has emerged: the federation of servers. In a system such as the Internet the capacity to store data is almost infinite. Searching across the ocean of data is accomplished by so-called search engines such as Yahoo. These engines are inaccurate and do not get direct access to relational data. Therefor more sophisticated systems, such as Informix or Oracle software products are customised and applied to well-organised and centralised data-collections to add all the handling tools, such linkage to electronic payment systems.

What is a Database?

A database management system, or DBMS, gives the user access to their data and helps them transform the data into information. Such database management systems include dBase, Paradox, IMS, and Oracle. These systems allow users to create, update, and extract information from their databases.
Compared to a manual filing system, the biggest advantages to a computerised database system are speed, accuracy, and accessibility.
A database is a structured collection of data. Data refers to the characteristics of people, things, and events. Databases store each data item in its own ***field***. The name of a field usually reflects its contents. Each DBMS has its own rules for naming the data fields.
A field has little meaning unless it is seen within the context of other fields. A specific field is informative only after it is associated with other data. In a database, the fields relating to a particular item are bundled together to form a single, complete unit of data, called a record (it can also be referred to as a row or an occurrence). Each record is made up of a number of fields. No two fields in a record can have the same field name.
During a database design, the analysis of your business needs identifies all the fields or attributes of interest. If your business needs change over time, you define any additional fields or change the definition of existing fields.
Databases store records relating to each other in a ***table***. A table is easily visualised as a tabular arrangement of data, not unlike a spreadsheet, consisting of vertical columns and horizontal rows.
A table consists of a number of records. The field names of each record in the table are the same, although the field values may differ. Each field occupies one column and each record occupies one row. In each column of the table, you put a specific category of information. Each row in the table contains the information relating to a specific item, together as one record. Each record is a unique entry and is independent of any other record in the table. The data contained within the records is independent of each other.
After the analysis of the business requirements, the database design process defines the necessary tables. Different tables are created for the various groups of information. Related tables are grouped together to form a database.
Every table in a database has a field or a combination of fields that uniquely identifies each record in the table. This unique identifier is called the key. The key provides the means to distinguish one record from all the others in a table. It allows the user and the database system to identify, locate, and refer to one particular record in the table. The database design determines the best candidate field for the key.

Relational Databases

Sometimes all the information of interest to a business operation can be stored in one table. For example, let's say the only data you need to maintain about your office supplies is a description of each item, its supplier, and the quantity on hand. It would be enough to have one office supply table with those data items as the fields.
More often, though, business applications involve many tables. Relational databases RDBMS are able to link the data in multiple tables. It stores data in two or more tables and enables you to define relationships between the tables. The link is based on one or more fields common to both tables.
It's not necessary that the linking fields have the same field names. What's important is their value and what they represent.
Remember that every table has a key making each record unique.
When a field in one table matches the key of another table, the field is referred to as a ***foreign key***. A foreign key is a field or a group of fields in one table whose values match those of the key of another table. You can think of a foreign key as the key of a foreign table.
When a foreign key exists in a table, the foreign key's table is sometimes referred to as a ***lookup table***.
Ensuring that the data among related tables is correctly matched is referred to as maintaining ***referential integrity***.
Queries allow the selection and display of just part of the data in a database. For example, you might need to display all the tutors from a particular department - this would be a simple query using data from just the tutors

table. A more-complicated query might be to display details of all the courses each tutor offers: this would use data from both the tutors and courses tables.
Available suppliers:

DBase

DBase is a database language for accessing data and delivering powerful applications in DOS, Windows and on the Web. DBASE Inc. is the worldwide publisher of dBase, the original interactive database environment. dBASE Inc. was founded to satisfy demands from the dBASE community for more frequent releases and better support for this legendary product. dBASE Inc is owned and operated by dBASE users and developers. The company is committed to the continuing enhancement of dBASE, its related technologies, and the future of interactive database environments.
dBASE inc.
2548 Vestal Parkway E
Vestal, NY 13860 USA
Tel:+1 6077290960
Fax: +1 6077293830
Website: http://dbase2000.com

Microsoft

Microsoft Access is a powerful relational database management system. It integrates data from spreadsheets and other databases and is the easy way to find answers, share information over intranets and the Internet, and build faster business solutions. Microsoft Access makes it easy to turn data into answers and includes tools that help even first-time users get up and running quickly.
Microsoft Corporation
One Microsoft Way
Redmond, WA 98052-6399
Tel: (425) 882-8080
Website: http://www.microsoft.com

Oracle

Oracle helps businesses with their most critical needs: managing information so that it is reliable, secure, and accessible to the right people, at the right time, and offering a comprehensive spectrum of products and services that translate technological advances into real-world solutions.
Oracle's products include the industry-leading Oracle database, development tools, and internet-enabled business applications for customer relationship management, manufacturing and supply chain, finance, and human resources.
Oracle Corporation UK Ltd
Oracle Parkway
Thames Valley Park
Reading
Berkshire
RG6 1RA United Kingdom
Tel 0118 924 0000
Website: http://www.oracle.com

Informix

Informix Corporation, based in Menlo Park, California, provides innovative database products that assist the world's major corporations to attain competitive advantage. Informix invented the first open relational database and introduced the first commercial object-relational database, to help businesses process, store and retrieve mission-critical data. Informix developed Informix Dynamic Server, a fast, powerful and reliable database engine, added with powerful tools to look at and interpret data and set up new distribution outlets. Informix provide complete solutions for transaction-rich (OLTP), Data Warehousing, Web enabled E-Commerce, and Content Management applications.
Informix
4100 Bohannon Drive
Menlo Park, CA 94025 USA
Tel: +1 650 926 6300

digital cinema

Digital Cinema is an innovative service. In the Digital Cinema world, motion pictures are directly transmitted across satellite to any cinema theatre capable of digital projection. The replacement of traditional (analogue) cinema technology is completed with encrypted transmission and deciphered reception.
New transmission technologies open the possibility to reach remote areas all over the world. As a result, films can be more widely distributed and cinemas can offer a larger variety of films to audiences and on top of that can offer flexible programming of the theatre. For security reasons the digitised film can be watermarked and encoded before transmission and can only be decoded by the projector thus offering protection against piracy.

New technologies also raise the opportunity to directly disseminate large events all over the world. These new technologies can also be utilised for casts to home entertainment systems.

Value chain

While digital technologies have penetrated several phases of the filmmaking process, distribution and exhibition so far have remained analog. Over the last two years, developments in technology have come to fruition that promise electronic display in theaters. Coupled with electronic display will be some form of digital distribution, which together with digital asset management and digital archiving we will define as "Digital Cinema." (If the benefits to distributors and exhibitors are sufficient, the content value chain may be profoundly altered by new developments in technology and new business models.)
Digital archiving, shipping and asset management will relieve distributors for the first time from the constraints of limitations in print manufacture and in the number of screens on which they can show a film at one time. This will clearly benefit exhibitors as well as distributors since exhibitors will have access to films more quickly and independently of their location.
We see the following main business implications of digital cinema for
(1) the **Film Content Value Chain** and
(2) the **Advertisement Content Value Chain:**

1. **The Film Content Value Chain** describes the end-to-end film process, from capture and acquisition, through editing and storage, to distribution and exhibition. (If and when this process becomes entirely digital, the terminology "digital cinema" may be redefined.) The Film Bargaining Process defines all aspects of the Film Content Value Chain, a system, in which money first flows out to finance the production, marketing, and distribution of a film, and then flows in from the consumer to the exhibitor, then back to the distributor, and from there to the production entity.
2. **The Advertisement Content Value Chain** describes the end-to-end cinema advertising process, from placement of the advertisement through storage to distribution and exhibition. The Advertisement Bargaining Process defines all aspects of the Advertisement Content Value Chain, a system, in which money first flows out to finance attracting spectators to theatres, the generation of marketing data (such as age group, income level, taste preferences etc.) and the sale of exposure of the advertisement to a specified audience, and then back in from the advertiser to the distributor to the exhibitor.

Digital Cinema Market

European Film
The dominance of the Hollywood Majors (Walt Disney, Universal, Columbia/Tristar, Warner Bros., MGM/UA, 20th Century Fox and DreamWorks) and Hollywood Mini-Majors (New Line Cinema, Phoenix, Artisan, Miramax et. al.) forms the basis of the current situation in the entertainment industry. These organisations make entertainment the most important export product of the USA.
In Europe most European films have no access to European cinemas, only national productions achieve a certain market percentage. When films are imported they usually do not come from other European countries, but from US (See Table 1 – Market Share of European Films).
Popularity of Cinema Projections
The rise of Digital Cinema makes it possible to create a network of European outlets for simultaneous European releases of films with relatively small budgets and affordable production methods.
In the USA people typically visit a cinema 4,8 times per year, whereas in Western Europe the annual average is 2 times (See Table 2 - Annual cinema visits per inhabitant per country).
Increase in cinema visits is a likely trend. The blockbuster Titanic has made the audience come to the cinema again, and caused the number of visitors to rise after a few years of descending trends.
Number of Cinemas
Communication experts report that there is a much broader diversity of films offered in the European Cinema than in the USA. This is the case in larger cities of Europe, but not in the smaller cities and in the villages on the countryside.
In France for example there are no cinemas left in 800 to 1000 smaller towns. There is one screen per 12.555 inhabitants in France, one per 19.867 inhabitants in Germany, one per 23.932 inhabitants in Italy, one per 25.075 inhabitants in England and one per 30.843 in Greece. In Portugal the situation is even worse by one per 42.475 inhabitants. In the USA the ratio is one per 9531 inhabitants.
In most of the Central and East-European countries the number of cinemas has decreased dramatically, and the national film production decreased even so. In Poland, where film always played an important role in the culture only one screen per 46.836 inhabitants exits. In Romania this number is one on 50.071 and in Bulgaria one on 68.933 inhabitants.
The numbers are less dramatic in other Central European countries such as Hungary, or Slovakia but in these countries the programming is under control of the American majors (Source: ***Media Salles, Yearbook 1998***).
Opportunities
Community creation is a very important issue in Digital Cinema. Initiatives like CyberCinema also create opportunities for other digital film issues (e.g: digital film storage & access, restoration). Educational material might be brought to the afternoon session for B-to-B or interactive education. **The Digital Cinema Network**

Digital Cinema is an innovative future oriented form of Cinema. In that respect it is inevitable to provide a clear market picture of digital cinema. However, the main market objectives of digital cinema could be summarised as follows:

- The replacement of traditional cinema technology with digital transmission and reception via satellite
- The return of cinema to regions and their inhabitants for whom it had seemed lost
- The development of a more economic and attractive cinema than conventional cinema
- The provision by the affiliated theatres of a wide variety of programmes
- The deployment of counterbalances of the American dominance in the European distribution market

Digital Cinema is a project developed by the Europäisches Filmzentrum Babelsberg e.V. ("EFB"). The aim of the project is to create a ***network of public spaces throughout Europe***, primarily located in rural regions and in underprivileged urban neighbourhoods. This "CyberCinema" network will be used for the transmission and reception of films with high resolution and in extraordinary good quality. With a lower resolution the very technology will also be used for the interactive and simultaneous transmission of civic debates between groups all over Europe, as well as a place of learning.

Available services and providers:

BARCO Projection Systems has been a world leader in large screen projection technology for nearly 20 years. BARCO's line of large screen projectors, peripheral devices and visual subsystems are installed in a broad range of applications: home theater and electronic cinema, presentation and training, entertainment and infotainment, rental and staging, process control and surveillance, simulation and virtual reality.

BARCO Projection Systems Head Office
Noordlaan 5
8520 Kuurne
BELGIUM
Tel: +32 56 36 82 11
Fax: +32 56 35 16 51
Website: http://www.barco.com

Sony

Sony Electronics offers a full line of display products including LCD, CRT and large venue projectors, broadcast/production monitors, info/presentation monitors, professional monitors, high definition monitors, home theater products, large screen displays and scan converters. All products are sold and supported through a national infrastructure.

Sony Electronics Inc.
1 Sony Drive
Park Ridge
NJ 07656
United States
Tel: +1 201 930 1000
Fax: +1 201 930 4752
Http://www.sony.com/professional

Texas Instruments

For over a hundred years, film projection has been the undisputed king of large screen movie presentations for shared entertainment experiences. With a new millennium fast arriving, Texas Instruments invented Digital Light Processing™ (DLP™), a new digital electronic projection technology, as an alternative to film projection. DLP technology was introduced as a commercial product in 1996, and quickly became the technology of choice for manufacturers making projection products ranging from the world's best selling projector, an ultraportable model weighing under seven pounds, to large venue models used for concerts, conventions, and other large audience events.

Electronic cinema will be digital cinema — and Texas Instruments with the Digital Micromirror Device (DMD) is well-suited to provide the motion picture experience to the digital cinema customer.

Texas Instruments
Rutherfoordweg 102
3542 CG Utrecht

digitising

The digitising process covers the conversion of content from the analogue domain to the digital domain. Digitising analogue materials is often initiated in order to preserve materials, to simplify handling of large collections, to improve (public) access to cultural heritage and societal information, to develop interactive information products and to create better dissemination and business opportunities.

The first step in the process, is to scan the analogue film by telecine to videoformats such as digital betacam or D1. In order to increase handling and speed of access in the computer environment, the video materials are compressed to standardised file formats.

Restoration and editing is possible during all stages of the digitising process, depending on goals set.

Within the technology available today, scanning and MPEG-2 compression still is a tedious and costly process. Business models prescribe that organisations should focus on bulk digitising.
Telecine and storage facilities, as well as bandwidth in network systems require substantial financial investments in state of the art equipment.

Why digitise?

Digitising film is usually initiated due to one or more of the following reasons:

- to make film available for Internet or MM applications
- to simplify the handling of a film archive
- to preserve the film

The three main application areas usually have different requirements as to the quality of the collection in digital form. To make a collection available via Internet, one should minimise the amount of data to be transferred to the end-user, and consequently a low or medium quality will often be accepted to obtain rapid access. When the objective is to simplify the handling of a collection, the digital format must have a quality high enough for normal use. Usually a medium to high quality is necessary. When film is digitised for preservation, the quality of the digital format must be high enough to represent all the relevant details that may be found in the original objects.

Careful selection of collections for digitisation

When starting a digitising programme, it is very important that the objectives are obtainable within the given resource limits. One should preferably start with collections with few technical challenges and no complex copyright problems. As the experience grows, one may develop the ambitions of the digitisation work incrementally and systematically, including restoration.

How to digitise?

Film is a continuous stream of information. It consists of a sequence of images and a stream of accompanying audio. The two streams are synchronous. Moving this information from an analogue to a digital format means cutting both the image stream and the audio stream into time slices, describing each slice individually and then keeping the synchronisation between the moving image and the audio.

Time slices

Moving images are in a way time-sliced in the analogue format, because it is a temporal stream showing a sequence of e.g. 18, 25 or 30 pictures each second, depending on the format used. Old silent movies use 18 frames per second (fps), the PAL video system 25 fps and the NTSC video system 30 fps.
In order to convert analogue moving images to a digital format, the approach is to provide a mechanism where you can describe each picture or frame as pixels in a two-dimensional array that corresponds to the height and the width of the given format. The equipment needed to perform this task is often referred to as a frame grabber.
When digitising film, there is no need during the sampling to exceed the number of frames per second used in the original format. In some cases one may experience that low end equipment is not able to operate at the same speed as the original's format. Then one may experience a non-continuous image stream at playback. However, the playback software will usually hold the synchronisation with the audio stream. To increase the number of grabbed frames per second the frame size or the brightness resolution may be reduced. As a general rule, the audio quality should be kept high, as high quality audio gives a subjectively better reception of the digital film stream.
There are a number of ways in which film wave-forms can be represented digitally, but there is one system, known as pulse code modulation (PCM) which is virtually in universal use.

Samples

Sampling is no more than periodic measurement, and you need a scanning mechanism which handles both the temporal and spatial sampling. The connection between the temporal sampling and the spatial sampling is the process of scanning film.
In order to produce digital moving pictures, the approach is to provide a mechanism where the value of every pixel in a frame can be updated periodically. This effectively results in a three dimensional array, where two of the axes are spatial, and the third is temporal.

Quality

The perception of film is always analogue, but it may be stored and transmitted in a digital format. The conversion processes to and from the digital domain are both important sources of degradation.
The quality of the conversion from the analogue to the digital domain (A/D converter) is most important. The obtainable quality depends on the spatial and brightness resolutions in the scanner, the scanner's ability to match the number of frames per second used in the original film format, the audio sampling frequency and resolution, and on the quality of the input film.
Once converted into the digital domain the degradation can be controlled, and it is possible to produce a variety of lower quality copies from a high quality version.
The conversion from the digital to the analogue domain depends on the D/A converter and the other computer equipment that is available on the local PC or workstation.

Information carriers

Digital film can be stored on video formatted information carriers (i.e. Digital BETACAM) as digital video and audio streams, or as ordinary files on common information carriers like hard disks, tape or optical disk. The choice between video formatted information carriers and ordinary files is of great importance for later use and usability of the film. For easy migration and access to digital film on computer networks, the film should be

stored as ordinary files. However, due to the very high data rate of uncompressed digital film, on-line storage of large amounts of such data is a major challenge using currently available technology.
Compressed digital film formats are therefore commonly used when handling digital video on computers. On CD-ROMs, DVD, and on the Internet, compressed digital video formats are always used. New video-on-demand services are based on the same compressed digital video formats, and even television broadcast companies currently broadcast from compressed digital video formats.

Storage size

The currently most used uncompressed digital video format, Digital CCIR-601, has a data rate equal to 167 Mbps. Using this format, a two hour video film needs more than 150 GBytes of storage space in a computer. Digital recording of full-frame, full motion video requires lots of disk storage space. The size of the image frame, the number of colours, and the frame rate all affect how much data must be captured. As quality increases, so does the amount of data required to represent the film.

Compression

Reducing the amount of data needed to reproduce images or video saves storage space, increases access speed, and is the only way to achieve digital motion film on personal computers. One approach is to remove data without affecting the subjective quality of the picture.
Several compression/decompression algorithms (codes) are available for compressing film to a variety of sources including CD-ROM, DVD, tape and disks. For professional use, as CD-ROM publication, video-on-demand and television production and broadcast, the MPEG-1 and MPEG-2 formats are most commonly used. In the Internet, other formats as RealVideo, AVI, H261, and Quick-Time are also commonly used. All of these formats involve throwing away large amounts of data as compared with the original uncompressed digital stream, and the compression schemes are irreversible.
All of these formats require special purpose equipment (hardware) for efficient and high quality compression of the digital video, while decompression and playback may be software based. The playback quality may vary a lot at the same compression data rate due to variations in encoder quality.
Several of the compressed digital video formats may also be streamed across the Internet during playback, i.e. the digital video file does not have to be downloaded before playback, but can be played directly from a remote server. This requires special purpose software at the server side. Stream based players may, however, be downloaded free of charge via the Internet. Stream based playback requires a stable network connection with a bandwidth at least equal to the data rate of the digital video format. Some examples on digital video formats that may be streamed across the Internet are MPEG (Xing), RealVideo (Progressive Networks), Clear Video (Iterated Systems), TrueStream (Motorola), VDOLive (VDOnet) and VivoActive Producer (Vivo Software).
The video formats may be compressed into a variety of qualities to support a variety of computer capabilities and network bandwidths. Data rates are usually from 1 Mbps to 8 Mbps for full motion video.

Manipulations

Once a film has been digitised and compressed, it can be manipulated and organised in much the same way that still-images are manipulated in image-editing programs. The major difference with the digital processing of film is the time-based aspect of the medium. The modern digital video effects (DVE) unit has a large repertoire of manipulations.

Hardware and software required

To digitise film, a video source and a video digitising board (frame grabber) are needed. In addition, an audio capture board is needed if the video digitising board does not support audio. There are many video capture boards on the market, and they differ widely in their features and capabilities.
Digital recording of high quality, full-frame, full motion video requires a fast computer with fast bus and disk technology, in addition to lots of disk storage space. The size of the image frame, the number of colours, and the frame rate all affect how much data must be captured, and thus how quickly and how well video can be recorded.
One has to make some trade-offs to reduce the amount of data needed when capturing video. There are many strategies for reducing the data, each of which compromises the quality of the captured video:

- Compressing the video data
- Reducing the image dimensions of the captured video
- Reducing the frame rate of the captured video

You can compress video data using both hardware and software compression. However, to efficiently compress the digital video, hardware support is strongly recommended. Decompression and playback may be software based with current computer technology. The playback quality may vary a lot at the same compression data rate due to variations in encoder quality.
Always start with the cleanest analogue video source available, as video noise increases the amount of data that must be compressed, and thus gives a poorer result. Also, it is advised to keep the digitised clips at the highest possible quality until the final movie is edited, and the result is to be published or broadcasted.
When digitising film, one should also be able to do some editing on the video stream. There are currently several video editors available for PCs, Macintoshes and workstations. Adobe Premiere is an example of a widely used video editor. To edit digital video efficiently, one should have at least 64 Mbytes of RAM, although it is possible to work with less RAM.
A Pentium PC, or equivalent, is recommended when performing digitisation, editing and playback of video, although much of the hard work during digitisation is done by the frame grabber. A large hard disk, 4 - 9 GB, is

also necessary. Playback of video also requires a fast video board, and at least 4 MB of VRAM is recommended for optimal playback. One should also use a good monitor, but sharpness is more important than brightness resolution.
Equipment-providers:
Sony Electronics Inc.
1 Sony Drive
Park Ridge
NJ 07656
United States
Tel: +1 201 930 1000
Fax: +1 201 930 4752
Website: http://www.sony.com/professional
Cintel International Limited
Watton Road,
Ware, Hertfordshire
SG12 0AE United Kingdom
Tel: +44 (0)1920 463939
Fax: +44 (0)1920 460803
E-mail: sales@cintel.co.uk
Website: http://www.cinteltelecine.com

Website: http://www.informix.com

education and culture

This service provides information and expertise in the field of application of digital content in educational and cultural multimedia products. This service will contribute to the strengthening of the European multimedia industry. It offers support for the development of competitive products with a real learning value. Next to the use of digital content for educational products digitisation is suitable in order to preserve cultural heritage.

events

date	**18 October to 21 October 1999**
	exhibit
subject	Film
event	**FilmExpo EAST**
venue	Trump Taj Mahal Casino Resort
city	ATLANTIC CITY
country	**NEW JERSEY USA**
contact	www.sunshineworld.com

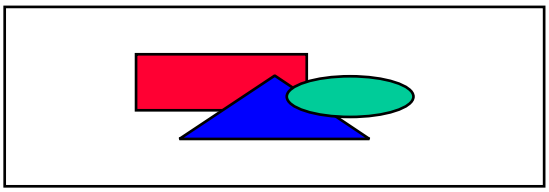
date	**8 April 2000 to 13 April 2000**
	exhibit: from 10 April 2000
subject	The Convergence Marketplace
event	**NAB 2000**
venue	LV Convention Center
city	LAS VEGAS
country	**NEVADA USA**
contact	www.nab.org

date	**June 2000**
subject	Digital Film

event	**Digital Dreams**
venue	Musis Sacrum
	Rembrandt Theater
city	ARNHEM
country	**NETHERLANDS**
contact	www.ifea.nl

date	**6 September 2000 to 10 September 2000**
subject	International Broadcast Convention
event	**IBC 2000**
venue	RAI
city	AMSTERDAM
country	**NETHERLANDS**
contact	www.ibc.org

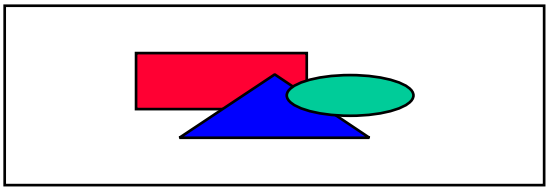
Films



see at least two movies. The major films that will be shown

ll offer the participants of the convention a film produced

The Kamara Film Company situated in Tblisi offers a Georgian film with the title 'Blue Mountain'.



Welcome indexnl.htmindexnl.htm

Do you like to know everything about Digital Film in Europe,
this is the place to be !

The Digital Dreams DFilm Convention is organised by IFEA and takes place spring 2000 in Arnhem.

At the Convention speakers from around the globe will give their views upon the world of Digital Film and its future.

The Convention will be a platform for Digital Film. Business experts, ministries and the audiance will interact.
Topics on the Convention are:

- **Instrumentation for digitising**
- **Film restoration**
- **Cyber-, digital- and interactive cinema**
- **Cultural heritage**
- **Educational applications**
- **Employment, and many more**

If you want to keep in touch with the world of Digital Film and you want to share your view, do not miss this Convention!

For the ideal navigation through this site, use the following arrows!

head.gifhead.gif2000en.htm2000en.htm

mailto:kontekst@euronet.nl

mailto:kontekst@euronet.nl

legal

The development of the information and communication technologies (ICT) has a huge impact on the existing legal systems. Convergence of industries is often overshadowed by divergence effects of different jurisprudence in souvereign countries on the Western hemisphere. Digitising can be detrimental to the position of the original author of the moving image on the continent of Europe.
This creates hindrances for the market of digital film. The position of copyright-owners is strictly protected in most jurisdictions and the position of owners of the original material needs to be safeguarded. Multi-media producers and all other players in the digital domain can invoke legal consultancy services enabling them to assess IPR situations, identify right holders and provide clearance or licensing of copyrights. This enables players in the field of digital film to proceed with activities in a legal manner. New inventions and applications in the Information and Communication Technologies will be worthwile protecting, even in a fragmented global marketplace.

Copyright

Almost everyone reads a book, looks at TV or watches a film once in a while. This is no problem and has no legal implications, as long as the book or film has not been prohibited. What if you copy the book or register the

film? Is this allowed or not? To answer these questions you have to enter into the copyright field. It depends on the use of the copy, the carrier of the copy, and the country in which you are. Due to the fact that each country has its own legislation, the answer can differ. Nevertheless you can discern similarities, which have also been promoted by international treaties and European harmonisation.
On the following pages you can read what copyright is, who 'owns' it, what you can do with it if you 'own' it, and about the possibilities and difficulties if you do not 'own' it.
However, this text does not pretend to be complete and exhaustive, it is a mere abstract, survey and assessment of the international situation.

What is copyright?

Copyrights (or 'author's rights) protect the intellectual creations of authors, including films and other audio-visual works. Connected with copyright are the neighbouring rights that protect performances, sound recordings (phonograms), first fixations of films and broadcasts. You can read more about this in a while.

Subject of copyright

What is the subject of copyright, what does it protect? Copyright protects "works", also indicated as "literary and artistic works" or "works of authorship". Works are intellectual creations which have an own, personal character and which are perceptible through the senses, that is can be seen, heard or read, whether directly or through the use of devices such as a film projector or computer. Ideas, procedures, methods or mathematical concepts as such are not protected (cf. Article 9(2) TRIPS).
As this site is about film, you will only find information about film as subject of copyright. But what is film? The term "film" means: a cinematographic or audio-visual work or moving images, whether or not accompanied by sound (see Article 2(1) European Council Directive on Rental and Lending). A film in itself may be an object of copyright and neighbouring rights protection as may be the different works, performances and sound recordings incorporated in a film. A non-exhaustive list of persons who may be involved in the film-making process and who may acquire copyrights or neighbouring rights depending on the applicable law and their actual contribution to the film. The exclusivity of copyrights and neighbouring rights in respect of films implies that authorisation has to be obtained from the rightholders in order exploit film.

European harmonisation

Within the European Union exists the free movement of goods and services. Disparities in the level of copyright protection can impede this. To deal with this issue, the European Union over the last years has adopted a number of Directives harmonising issues of copyright, neighbouring rights and trademark protection:

- Council Directive 92/100/EEC of 19 November 1992 on Rental Right and Lending Right and on Certain Rights Related to Copyright in the Field of Intellectual Property;
- Council Directive 93/83 of 27 September 1993 on the Co-ordination of Certain Rules Concerning Copyright and Rights Related to Copyright Applicable to Satellite Broadcasting and Cable Retransmission;
- Council Directive 93/98/EEC of 29 October 1993 Harmonising the Term of Protection of Copyright and Certain Related Rights;
- Council Directive 96/9/EEC Directive of the European Parliament and the Council of 11 March 1996 on the Legal Protection of Databases.

While these Directives harmonise copyright legislation to a considerable extent, differences between national laws may still occur as a result of diverging implementation of the Directives into national law.

Authorship and Copyright Ownership

Now you know more about copyright, but who is the owner. The owner can be either the original copyright owner, the natural person or the legal entity to which ownership has been transferred. The copyright may be jointly owned by several persons or entities. It is also possible that the various exclusive rights comprised in the copyright are owned by different parties.
Basic principle of copyright law today is that the copyright vests in the 'author'. The 'author' being the flesh and blood creator of the work: creator = author = first owner of the copyright. Most national copyright laws provide special rules on authorship of audio-visual works.
Most national copyright laws accommodate the producer in this respect by presuming that the producer has acquired certain rights from the authors even in the absence of an express agreement to this effect. Several systems are used:

1. Presumption of transfer: the copyright law assumes that the co-authors have assigned their rights to the producer, unless otherwise provided (e.g. in France, Netherlands and Germany).
2. Film copyright: the producer is assigned as the creator and therefore he/she is the copyrightholder (e.g. United Kingdom).
3. Cessio legis: the copyright is transferred to the producer by operation of law (e.g. Italy and Austria).

In this paragraph, the present situation with regard to authorship and copyright ownership has been described. Note however, that in assessing whether certain rights in respect of a film have been acquired by the producer

or are (still) owned by the creative contributors, one has to look at the applicable national law of the time the film was made.

Limitation of copyright protection

This was a short overview of the rights of the copyright owner (§ 3) and the exploitation possibilities (§ 4). Is it also possible to protect your copyright? Yes. However, the scope of copyright protection is limited by the principle of exhaustion, the notion of 'public' and the duration of protection. The principle of exhaustion is defined as that once a copy has been put into circulation with the consent of the rightholder, the latter cannot prohibit further distribution of that particular copy. The notion of public is not internationally defined, but you can consider a performance within a circle of family or friends not public. About the duration you can read in paragraph 6.2.
In addition, the copyright laws generally provide a number of exemptions allowing certain uses without prior authorisation of the rightholder or against payment of an equitable remuneration. These exemptions consist of:

- copying for private use
- educational use
- the right to quote for certain purposes
- different position for libraries, archives
- miscellaneous

Duration

The duration of the copyright protection is not eternal. However, it differs in each country. Nevertheless for countries member of the Berne Convention it is fifty years after the cinematographic work has been made available to the public. In the European Union this term is seventy years after the death of the last of the principal director, the author of the screenplay, the author of the dialogue and the composer of the music (especially created for the use in the work).

Neighbouring Rights

As already mentioned before next to the copyright exist the neighbouring rights. These rights are the exclusive rights of performers, producers of phonograms, broadcasting organisations and film producers. The operation of these rights is quite similar to copyrights. The major difference is in the scope and term of protection. Most countries have a neighbouring rights act next to a copyright act. Hereafter you will find a short extract about the various parties, holders of neighbouring rights, in relation to the Rome Convention. Countries can decide to grant a broader protection than required by this convention.

Performers

Performers as defined in article 3(a) of the Rome Convention are singers, musicians, dancers, and other persons, who act, sing, deliver, declaim, play in, or otherwise perform literary or artistic works. In addition, acts of folklore may also be considered performance under the national law (see also Article 2(a) WIPO Performances and Phonograms Treaty).
They also have some exclusive rights:

- fixation of their unfixed performance
- reproduction of a fixation of their performance if the original fixation itself was made without their consent, or if the reproduction is made for the purposes different from those for which the performers gave their consent
- broadcasting and communication to the public of their performance, except where the performance used in the broadcasting or the public communication is itself already a broadcast performance or is made from a permanent fixation

Broadcasting organisations

According to the Rome Convention broadcasting is defined as the transmission by wireless for the public reception of sounds or images and sounds (Article 3(f) RC). Re-broadcasting is defined as the simultaneous broadcasting by one broadcasting organisation of the broadcast of another organisation (Article 3(g) RC).
Article 13 of the Rome Convention grants broadcasting organisations the right to authorise or prohibit the:

- re-broadcasting of their broadcasts;
- fixation of their broadcasts;
- reproduction of fixations, made without their consent, of their broadcasts or fixations which are used beyond what is permitted by the exemptions of Article 15;
- communication to the public, if made in places accessible to the public against payment of an entrance fee.

Film Producers

The Rental Directive prescribes EU Member States to accord neighbouring rights to film producers for their first fixation of films. These rights exist independent of and do not affect the copyright in the film.

According to Articles 2(1), 7(1), 9(1) Rental Directive, the producer of the first fixation of a film has the exclusive right to authorise or prohibit:

- the reproduction of the first fixation or copies thereof;
- the distribution of the first fixation or copies thereof;
- rental rights.

Ownership, assignments, licensing

Neighbouring rights may be assigned and licensed. The rules on assignment and licensing of neighbouring rights are determined by the national law. The formality requirements mostly are the same as for copyright assignments and licenses. Specific provisions may exist in the national laws with respect to the exercise of rights in case of performances by a group (band, orchestra, ballet group, etc.) or in case of performances made in the course of employment or made as a contribution to a film. As for the latter, the presumptions of assignment or license that exist with regard to film authors in most cases also apply to performers contributing to a film production.

Exemptions

Article 15 Rome Convention allows member states to adopt exemptions to the rights of performers, phonogram producers and broadcasting organisations in the following situations:

- private use;
- use of shorts excerpts in connection with the reporting of current events;
- ephemeral fixation by a broadcasting organisation by means of its own facilities and for its own broadcasts;
- use solely for the purposes of teaching or scientific research.

In addition, the contracting state may provide for the same kinds of limitations with regards to the neighbouring rights as it provides for in connection with the protection of copyright. However, compulsory licences may be provided for only to the extent to which they are compatible with the Rome Convention.
This same provision is repeated in Article 10 Rental Directive. In practice, most neighbouring rights laws more or less provide the same exemptions as exist with respect to copyright.

Duration of Neighbouring Rights

The term of protection is determined in accordance with the national law of the country where the protection is sought. The minimum protection under the Convention is a period of twenty years which is calculated at the end of the year in which the:

- fixation was made for phonograms and for performers incorporated therein;
- performance took place for performers not incorporated in phonograms;
- broadcast took place.

The TRIPS Agreement prescribes a minimum protection of performances and phonograms of fifty years from fixation or performance and a minimum protection of broadcasts for twenty years from broadcast (Article 14(5) TRIPS).
Pursuant to Article 3 of the EU Term of Protection Directive, the term of protection within the European Union is fifty years to be calculate, in case of:

- performances, from the date of first publication or first communication to the public, whichever is earlier. If such event does not occur within fifty years from the performance, protection expires fifty years from the performance;
- phonograms and first fixations of films, from the date of first publication or first communication to the public, whichever is earlier. If such event does not occur within fifty years from the fixation, protection expires fifty years from the fixation;
- broadcasts, from the first transmission of a broadcast, whether this broadcast is transmitted by wire or over the air, including cable or satellite.

The terms of protection provided by the Term of Protection Directive apply to all performances, phonograms, first fixations of films and broadcasts that are protected in at least one Member State on 1 July 1995. This may lead to a revival of neighbouring rights. To the extent that the national law protects performances, phonograms, first fixations of films and broadcasts from non-EU countries, protection expires according to Article 3 of the Directive.

Available suppliers

International Law Firms:
Denton Hall Burgin & Warrens
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5 Chancery Lane
London EC4A 1BU
Tel: (44-171-) 320-6501
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Schwarzberg Brehm Wilde
Herrn Wolfgang BREHM
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Matheson Ormsby Prentice
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3 Burlington Road
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