

PART VII

MULTIMEDIA VIDEOS

PART OVERVIEW

Digital video adds colour and pomp to multimedia projects. Without full motion videos, it is difficult to imagine successful multimedia.

But handling videos is a tricky issue and needs quite a bit of conceptual understanding. This part is dedicated to this single purpose. Right from understanding the basic technologies and concepts, this part contain detailed chapters that expose all the professional video editing and manipulation techniques frequently made use of in studios and production houses.

This part has two chapters: First one details all fundamental concepts associated with digital multimedia video technology and the second concentrates more on the editing aspects of the same.

Chapter 18

Introducing Digital Video

CHAPTER OVERVIEW

This Chapter is mainly concerned with the fundamental concepts of Digital multimedia Video Technology. Everything concerning multimedia Video - From Quarter screen Video clippings to MPEG standards, from Video for Windows to Apple's Quick time Player - has been discussed in sufficient light.

This Chapter lays the foundation for an exiting journey into the Jargons of multimedia Video - in the next Chapter.

18.1 Introduction

Digital videography is the order of the day.

From Video CDs (or VCDs) to Digital versatile disks (or DVDs), digital medium is dominating the landscape. Even television broadcasts are becoming digital, offering excellent quality in pictures and sounds.

Digital video has been recognized as a medium in multimedia technology – along with texts, audio and animations. There are many challenges in running video movies within multimedia applications. This chapter and few others that follow will expound this topic at reasonable depths.

18.2 Role of digital videos in multimedia projects

It is interesting to think about situations in a multimedia project that demand digital videos.

For example, let us consider 'Tourist's India – Interactive Multimedia Guide' CD-ROM. The product features important tourist places all across the country. It will be nice, if we could show some video clippings filmed on specific locations – while talking about that particular tourist destination. This will help the user to visualise things and imagine the look and feel of that particular location.

As a second example, let us look at Microsoft Oceans CD-ROM. It will certainly be a value addition, if we could add a few video clippings filmed underwater – right inside the oceans. It will nicely supplement the facts and figures we are presenting about oceans.

Now, let us consider a third example – where digital videos are unnecessary.

Tales from Indian Mythology CD-ROM features animated tales for children. The whole CD-ROM, from end to end, is full of digital animations. If we were to feature digital videos in-between, it will most certainly interfere with the aura created by fantasy worlds created with the help of 3D and 2D animations. Hence it should be avoided.

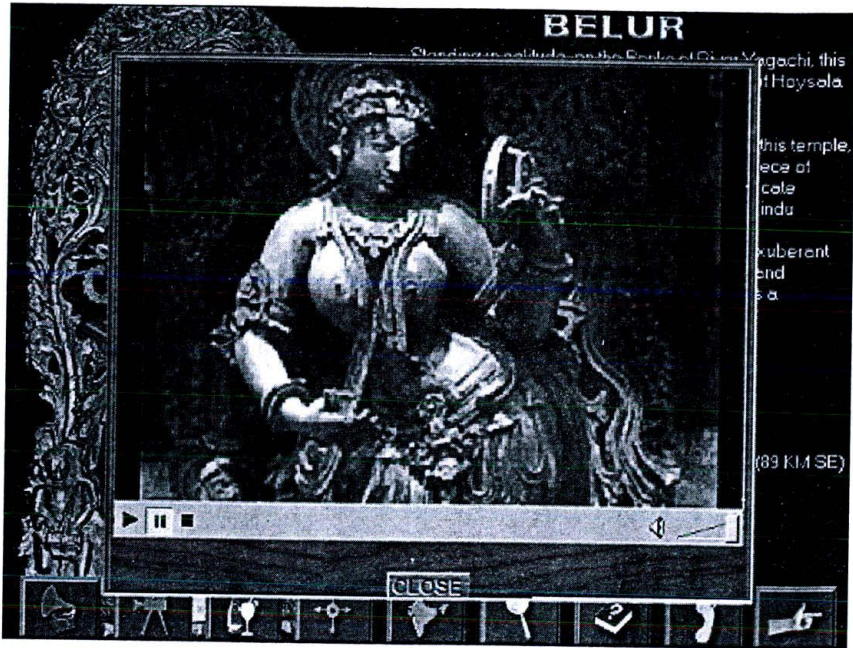


Figure 154: Digital videos provide value addition to Tourist's India - Interactive Multimedia Guide CD-ROM.

If we consider all other multimedia application scenarios like this, we will see that digital videos are relevant and useful under the following circumstances:

- The project has certain relevant sequences/ material that can be presented only by means of digital videography. Example: Underwater sequences for Oceans title.
- The project provides good scope for digital videos. Example: A black and white footage of Mahatma Gandhi – for a CD-ROM on India's freedom struggle.
- The project must feature live lectures / demonstrations / other pre-recorded material. Example: The chairman's annual shareholders meeting speech for a corporate presentation.
- The project has to feature sequences that are not viable or economical to produce by means of animations. Example: Lip and face movements of a presenter, in a multimedia-shopping kiosk.

18.3 Video Playback

Most windows operating systems can playback all the basic forms of video like .avi and .mpg via the Windows media player software. Media player 9 about which we elaborately discussed in an earlier chapter has very good support for videos.

Windows media player recognizes the following video file formats:

- MPEG files like .mpg, .mpeg and .m1v
- Windows media files like .asf and .wmv
- Windows audio-video file .avi



Figure 155: Media Player 9 playing back a digital video file from CD-ROM title 'Six Sacred Temples', published by cybervalley systems.

18.4 Quarter screen and full screen videos

In most multimedia applications, you will see that the videos featured do not fill the entire screen – mostly they will open out in a small window, which is approximately one fourth of the total screen area. Refer the example we provided in the beginning of this chapter and note that the videos are not full screen.

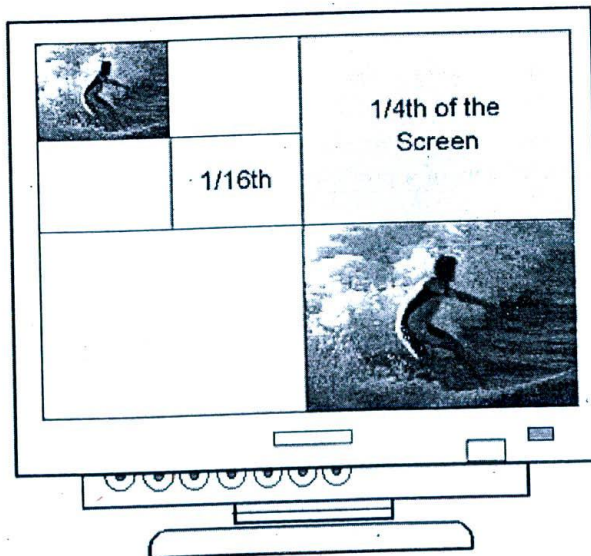


Figure 156: Quarter screen video - illustrated

Try another experiment. Take a movie VCD disk and try to open any of the .dat files under the mpegav directory using windows media player. You will be surprised to see that the movie opens up in a small window and does not fill the entire screen.

Try to right click on the movie screen and in the menu that pops up, choose 'Full screen'. Presto! The movie is now running full screen... But, wait! The quality of the movie is not very good, right?

You might be surprised at this behaviour, because the VCD looks so nice full screen in a television! If you move yourself away from the monitor, the results are lot more tolerable.

What is the reason behind this behaviour?

Remember our talks on resolution of the monitor, earlier. Actually television monitors have much lesser resolution when compared to computer monitors. Hence, relatively lesser pixels are required to fill the entire screen. But a computer monitor has at least 640*480 resolution – demanding more pixels for display. That is why you are watching television, only at a distance whereas you sit much closer to a computer monitor.

Moreover, while featuring video contents on a multimedia project, one has to give room for play, pause and close buttons which the user is likely to click. It is also possible that you may need to display some text along with the video contents – possibly some explanatory notes or supplementary information.

Because of all these reasons, multimedia producers often present the video contents as quarter screen videos or even less.

18.5 Full motion video

Multimedia videos that display pictures at the rate of 25 to 30 frames per second (fps) are called full motion videos. Television displays pictures at the rate of 25 to 30 fps. 25 fps is a PAL standard, which is the broadcast standard adopted in most Asian countries – including India. 30 fps is the NTSC system, which is mainly adopted in USA and certain other countries.

25 fps results in very quick transition of still frames – resulting in smoother movement.

In the world of multimedia video, there were some problems initially in handling 25 frames per second – due to limitation of the processor and other resources. Hence videos with 15 to 20 frames per second were adopted – but this resulted in lot of jerks and other issues.

But now, with advanced multimedia video compression technologies like mpeg, 25 fps is not an issue anymore.

18.6 Video compression algorithms or CODECS

Raw videos without any compression will occupy huge file sizes – even a small video clip spanning a few seconds will consume several megabytes of storage space. For example, let us consider a video clipping of size 320 * 240 (which is a quarter screen video, when the resolution of the monitor is 640*480) playing at the rate of 30 frames per second (full motion) in true 24-bit colour.

In such a video, each frame would consume approximately 225 KB. Since we need to store 30 frames per second, we need at least 6750 KB per second or 6.59 MB! Imagine how much memory we will need to store 10 seconds of such data! It becomes impractical to handle raw videos of that size.

Hence, digital video professionals came out different kinds of compression algorithms to handle raw video. These compression algorithms have grown in number over a period of time, and it is most likely that even in your own desktop computer – at least a dozen video codecs may already be installed!

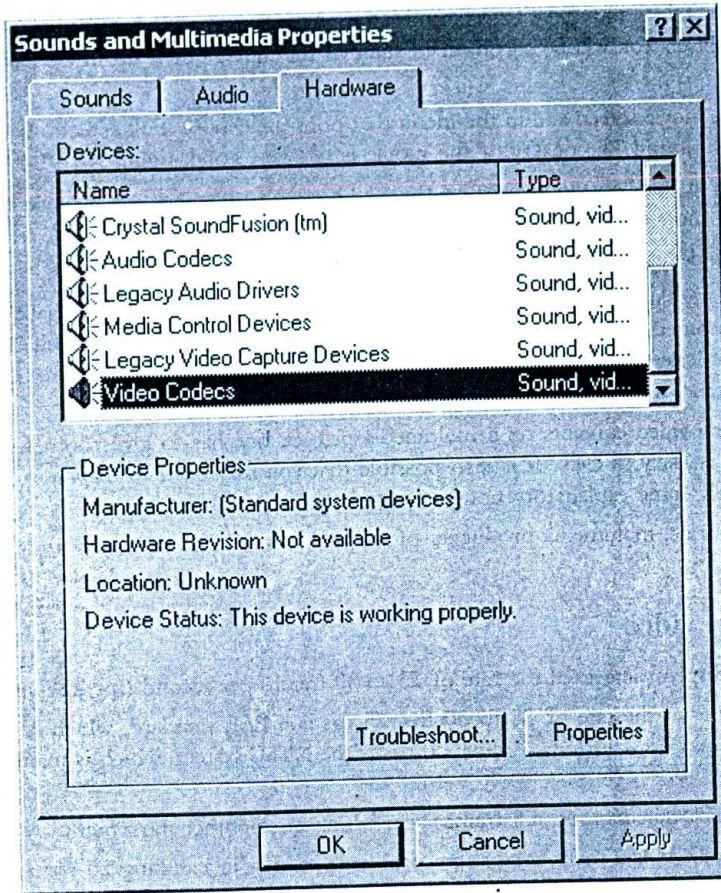


Figure 157: Many video codecs are pre-installed on windows 2000 operating system

To view what are all the video codecs installed on your win2000 desktop, go to Control Panel à Sounds and Multimedia Properties à Hardware and double click on the video codecs item. It is interesting to note that even audio has its own compression algorithms – registered under the title audio codecs.

The dialog box that pops up, lists all the different video codecs installed on the system – with all the necessary details. If you want to explore any particular codec further, you can do so by clicking on the same and choosing the properties button.

Each of these codecs may handle different types of file formats. For example, in the image displayed below, Intel Indeo codec handles a specific type of avi compression, Microsoft MPEG-4 Video codec handles .mpg videos and so on.

When a particular codec is not installed on the system and when you try to play a video file, which uses that codec – windows media player reports an error and tries to download the codec from the Internet. If the attempt succeeds, then the downloaded codec is installed on the system and the video is played back; but when the attempt fails, media player reports that the video file cannot be played back.

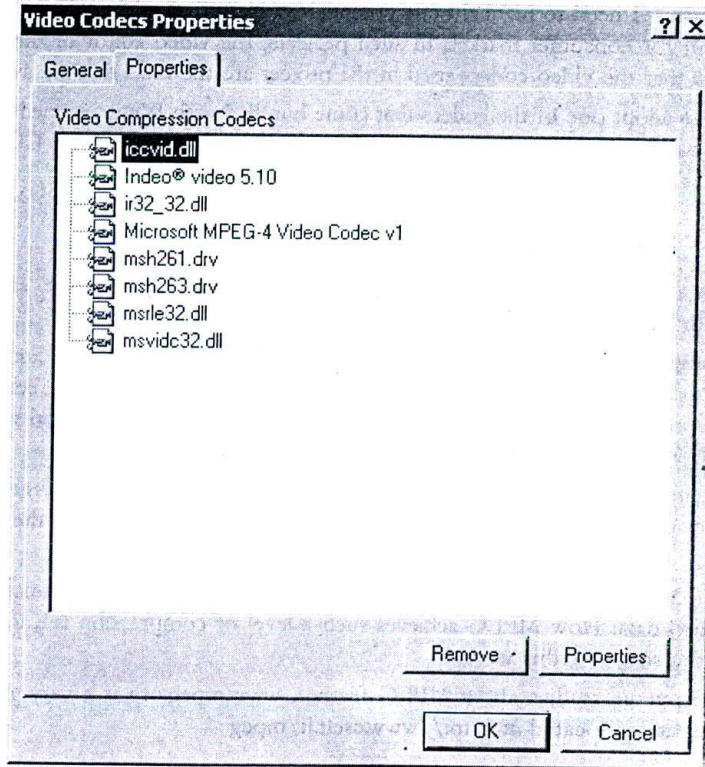


Figure 158: Details of different video codecs installed on a system

Some famous Video codecs are provided in the table below:

Table 29: Popular video codecs

Product	Company
Intel	Indeo Video Drivers
Microsoft	Microsoft Video1, Microsoft RLE, Microsoft MPEG-4
IBM	Ultimotion
Supermac	Cinepak drivers
Creative	Spigot
Moving Picture expert group	MPEG

The process of compressing raw video, using a particular compression algorithm is called *encoding*. The process of interpreting the encoded information and understanding the audio or visual information contained in them is called *decoding*.

For encoding our videos, we may need specialized software encoders available from various vendors. However, for decoding, we can use Microsoft Media player or Apple's quick time player that contain decoders for all commonly used codecs.

While speaking about **codecs**, I need to highlight one potential problem that might arise – particularly in multimedia CD-ROM projects meant for consumer market. In such projects, the video editor of the project or the program manager needs to **ensure** that the video codecs used in the project are the ones that are available on most systems. The safest alternative **is to** adopt one of the codecs that come bundled with Windows media player and recommend the end consumer to **download** and install the latest media player before trying out the CD-ROM title. In this way, we ensure that all the **codecs** we used are present in the consumer's system as well.

18.7 The MPEG revolution

In the earlier section, we saw what are codecs and why they are important. MPEG is also an advanced compression-decompression algorithm meant for audio and video data.

The term MPEG (pronounced M-Peg) stands for 'Moving pictures experts group' – a committee that works under the direction of International Standards Organization (ISO) and the International Electro-Technical Commission (IEC). It represents a set of international standards for encoding and decoding digital audio and video data. Thus we have standards like MPEG I, MPEG II, MPEG Audio Layer III, MPEG IV etc.

MPEG can rightfully claim the distinction of being the most influential technology in recent times, in the world of digital videos. Its impact can be felt all along – the mp3 audio encoding technology, the VCD and DVD format videos etc.

The major advantage of MPEG is its capability to encode and reduce the file sizes dramatically, without sacrificing the quality of audio/video data. How MPEG achieves such a level of compression is a topic of detailed academic studies and is beyond the scope of this work.

For those who want to pursue studies about MPEG further, www.mpeg.org is a very good starter. The official home of MPEG committee is located at <http://www.cseit.it/mpeg>

18.8 Summary

Video is incorporated into multimedia projects to zap up the contents and present a media rich experience to the user. They are mostly meant for contents and not interface design.

The file sizes of digital videos are necessarily very large and this leads to popular usage of small video clippings. Hence, multimedia videos may be quarter screen videos or even lesser.

Digital video files played back at 25-30 frames per second are called 'full motion videos' - meaning that the motion is pretty smooth.

Compression-decompression algorithms are used to compress the videos for storage and uncompress them at runtime. Flavours of Microsoft windows operating system comes bundled with the relevant codecs to handle most digital video file formats.

The MPEG technology is revolutionizing the digital video landscape.

18.9 Keywords

- Codec:** Acronym for compression-decompression algorithm for digital video files.
- Full motion videos:** Digital video files played back at a speed of 25-30 frames per second.
- Mpeg:** motion picture expert group

Chapter 19

Digital Video Production Techniques

CHAPTER OVERVIEW

This extensive chapter builds over the fundamental concepts of digital video we learnt in the earlier chapter.

First we understand various steps involved with digital video production process – right from equipments, location, video shooting and video capture. The process of digitising videos with the help of video capture cards is detailed at length.

Once digital video clippings are available, the arduous task of digital video editing and post-production begins. The chapter provides a very good overview on this subject, detailing all the fundamental concepts – one by one – with specific examples and later on, illustrating the same with Adobe premiere – one of the frontline suites meant for video post-production.

19.1 Introduction

In the previous chapter, we have developed a conceptual understanding of what makes up a digital video file. In this chapter, we will learn how to produce the same, edit / apply post-production effects and make it available for our projects.

19.2 Video production for multimedia projects

Producing digital video elements for multimedia projects involve the following steps:

- Shooting the necessary video sequences using a video camera
- Capturing or digitising the video data
- Video editing and post-production
- Embedding into the projects

We shall focus on each of these steps, in the pages that follow.

19.3 Video shooting

Shooting the required sequences for a multimedia project involves relevant equipment, people, location, storyboard and money! Depending upon the specific requirements of the project and the budget available, it may turn out to be a simple handy-cam shooting on a nearby location or a complex shooting involving different locations and characters.

19.3.1 Equipments

You can either buy a latest digital personal handy-cam or camcorder for yourself or you can hire appropriate equipment for the required period of time. If it is a low budget project or a personal production, I recommend that you stick on to your own equipments and people. But if it is a corporate or a film/ television project wherein you have sufficient funds, you can extend the arms as much as you can – for better results.

If you are going for personal handy cams, I recommend that you go for the one that has digital USB output. This might be slightly higher than the conventional equipments with standard DV In and DV Out – but the money you invest can be recovered during video capture process. You need not buy dedicated cards, if your digital handy cam itself comes with USB Out feature – all you need to do is to ensure that your motherboard has a USB or USB2 port on the back of your system. The results are also much better than their counterparts.

During video shooting, you can take the help of your friends who have some knowledge of videography. Quite a number of variables are involved in a shooting process - lighting, shooting angles, location, colouring, movements – all play their role.

If you decided to go for hiring professional cameras, you need to hire good videographers too.

Pay specific attention to the recording format used by the equipment – there are video standards like VHS, S-VHS, U-Matic, Hi-8, Beta cam SP and the superior Component digital / Composite digital recording formats... these recording formats govern the quality of recording to a considerable extent. Beta cams offer acceptable quality and are available at reasonable rentals.



Figure 159: Digital handy cams and personal camcorders are becoming more professional, powerful and packed with features – day-by-day.

Whatever may be the equipment, remember that the data has to be either recorded as digital data or should have the capability to be digitised. For example, if you are recording using a beta cam camera, you should have a service provider who can convert this beta cam recording to digital format for you. Such facilities are available in most cities and metros which have some kind of ongoing movie / television industry activity.

Also, pay attention to the broadcast standards like NTSC, PAL, and SECAM and decide which will be most suited for your purpose.

19.3.2 Backgrounds & landscapes

Remember this as a thumb rule: The lesser the number of colours the better your video output is going to look like. What do we mean by this?

Let us say you are going to shoot a landscape with a river stream, trees, rocks and the sky. Here we can say that three to four colours are going to dominate – Blue (sky, river etc), Green (Trees), Brown (Rocks, tree trunks etc.) – and this is very much acceptable. But let us say you are shooting a rainbow or something like that – here, more than 7 colours, quite unrelated to each other – are going to come into play.

You will not see any major problems with both these scenes during the video shooting or preview – but colouring issues will arise during video encoding. This has something to do with the way video encoding is done in MPEG. When multiple, unrelated colours are used in a single frame – something called bleeding occurs along the edges of the image, thus pulling down the quality of the frame.

The second point to be considered with respect to the background is whether the background is going to be replaced or edited during post-production. For example, if you are shooting the speech of a company chairman against the background of a wall, you may want to replace this with some other decent graphics during video editing.

If this is the case, remember to shoot the videos under a salient blue background. During post-production, this blue background can be replaced with whatever background you choose to use. This technique is called chroma keying and is quite popular among the professionals.

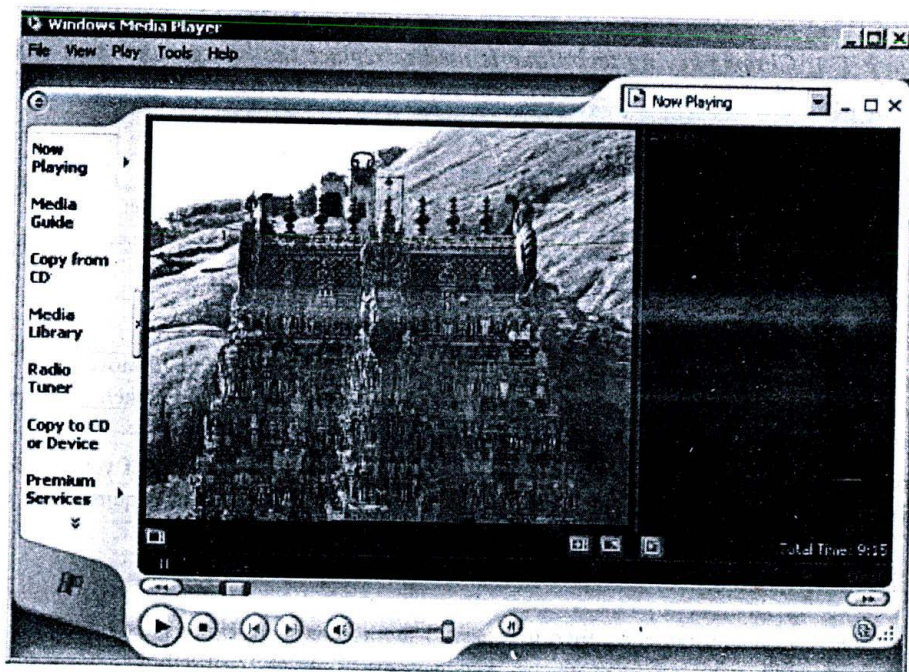


Figure 160: Colour bleeding invariably creeps in, when the number of different colours in a shot, is more. This temple tower features so many contrasting colours near one another - resulting in bleeding.

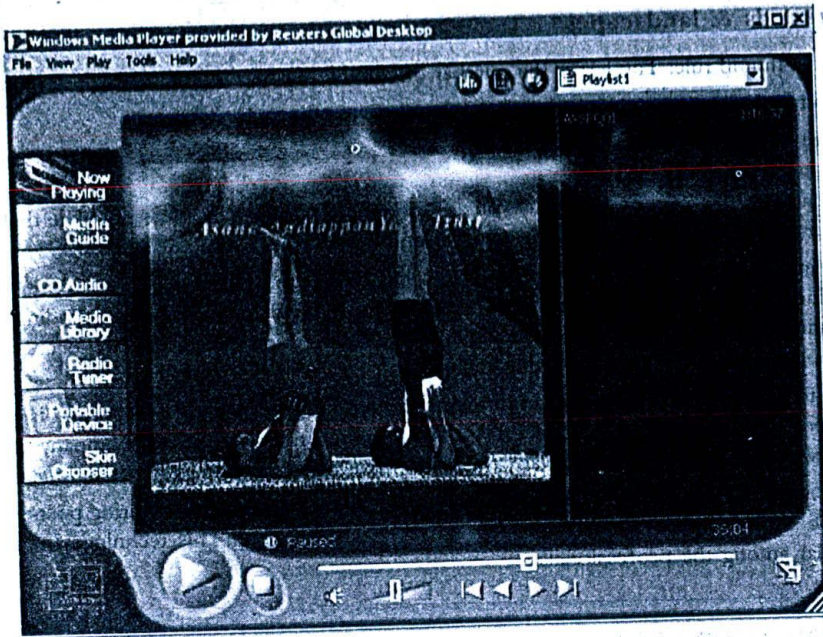


Figure 161: Chroma-keying technique is used to replace the background with which the original video sequences were shot in Cybervalley system's Yoga CD-ROM

19.3.3 Controlling camera movements

While shooting video sequences, the following combinations of movements are possible:

- Camera stationary, objects moving.
- Object stationary, camera moving.
- Objects as well as camera moving.

The safest option is to limit the movement of camera and let the objects do the required movements. This is because of the experience required in handling camera movements without causing jerks or shakes. These jerks cannot be corrected even during post-production and hence becomes a difficult problem to tackle.

Professional recordings make use of rails to restrict the movement of cameras – but if you are doing your own personal recordings, the control very much lies with your hands and shoulders. This requires both experience and practice.

19.3.4 Lighting

If you are a beginner with little experience, then it is best to shoot in daylight. Understanding of light and its impact on videography comes with experience and till then it is best to stick to ambient lighting.

Experienced professionals can handle light in the best possible manner. They can use light as a part of story telling process – using it efficiently to create the mood they wish to portray.

Lighting errors can be adjusted in post production to some extent.

With these limited discussions, we will conclude our notes on video shooting. Videography is a technique as well as an art and cannot be learnt in one day – that too by just reading books. It requires considerable fieldwork and experience to master this art.

For multimedia professionals who wish to make out a career in post-production and videography, I'll seriously recommend some real training under an expert guidance.

19.4 Video capture process

Video-capture or video digitising is the process of converting analog video signals to digital data. The signals, once converted, are fed into the computers and stored as digital video files.

The process of video capture varies, depending upon the equipment used for video shooting.

- ❑ If you have used a camcorder or handy cam with digital video out option using USB, then the videos can be captured directly – without the need for external interface.
- ❑ Some handy cams support fire wire interface instead of USB, in which case you need a fire wire card for video capture.
- ❑ If none of these interfaces are supported, then you need a dedicated video capture card – which will accept the audio and video signals from the camcorder and do the digital conversion process using dedicated chips.
- ❑ If you have rented the equipment, then the output will be available to use as a Hi8 or beta cam tape – in which case, you need a relevant player to playback the video contents and capture the data using dedicated video capture board.

Thus it is not absolutely necessary that you should purchase a dedicated board – in order to capture videos into your computer. The equipments you have used for videography dictate the choice and options available for you.

On the application side, you certainly need dedicated software to capture the video signals coming into the computer and store them as digital video files in appropriate formats. Most video post-production software like Adobe Premiere, Ulead Video studios etc have facilities with which video capture can be accomplished with ease. If you do not have any of the above-mentioned software, try out some of the free tools available on the net. One problem with these tools is the file format in which you are going to capture – which we will discuss in a short while from now.

Let us draw a flow diagram to illustrate what we have been discussing till now.

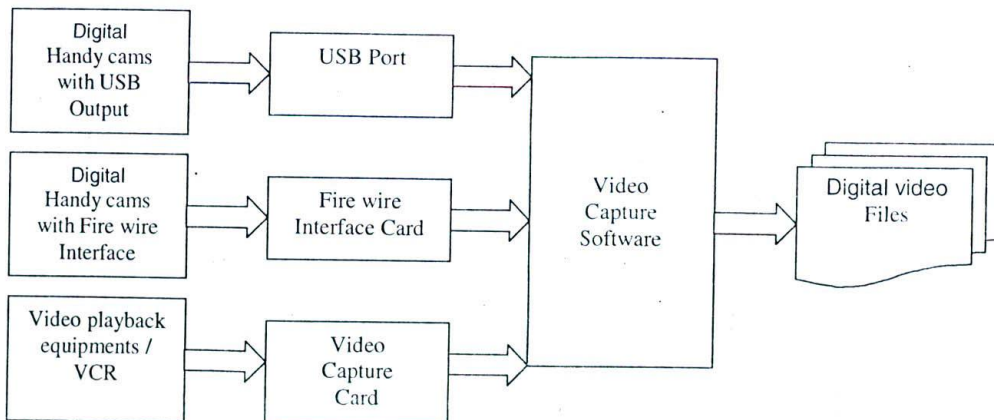


Figure 162: Process of video capture

19.4.1 Video capture cards / equipments

A video capture card is a specialized electronic circuitry that is capable of converting analog video signals to digital video signals. These cards usually fit into the 32-bit slot of the motherboard with all the video in and out jacks projecting on the rear side of the cabinet.

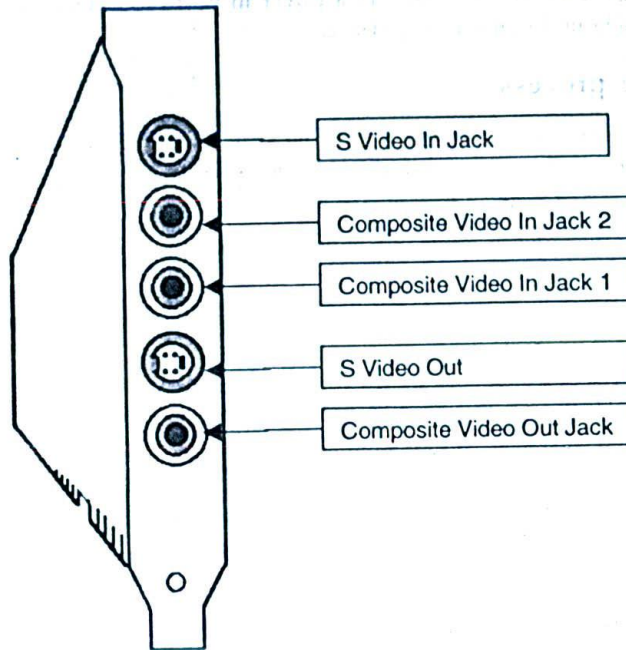


Figure 163: Rear side of a typical video capture card

Quite a number of video capture cards are available in the market and making a purchase decision is not easy. The purchase should be governed by many factors like the requirements of your project(s), capabilities of the equipment, budget and support available.

A good beginning point will be to look at some of the comparisons and tests that are frequently published in computer magazines and in the Internet. Just type "Video capture cards comparison" in any search engine like www.google.com or www.yahoo.com and you will be getting some very good information that will serve as a guideline.

The following points are worthwhile to consider:

- Does the card support 640*480 size video capture in real time? Or is it limited to quarter screen or 320*240?
- Does the card support full motion video capture at 30 frames per second?
- What are all the software that come bundled with the card? Does the bundle include post-production software?
- What are all the video input jacks supported by the card? S-video? Composite video? What else?
- Does the card come with necessary cables like s-video / composite video cable?
- Does the card have TV tuning capabilities? (This feature will allow us to record TV programs directly into the computer, as digital video signals!)
- What is the general performance of the card – when compared with other cards?
- How about the processor and memory resources required?
- What are all the digital video file formats supported by the card? Does it have real time MPEG video encoding capabilities?
- What are all the video standards supported by the card? NTSC? PAL?
- How easy it is to install the card and make use of the software for video capture?

The above questions would have given you some idea, which will guide you through the right purchase. It is best to check up the net and find out those vendors who ship their products internationally. Even for the very same cards, some vendors will offer very good deals. The only problem with net purchase is that local warranty and support will not be available.

Apart from capture cards, there are also dedicated equipments available for video capture. These are like set top boxes with relevant cables for input and output. They capture signals from video sources and relay the digital video data into the computer - using USB ports.

19.4.2 Different steps in video capture process

Equipments required:

- A Multimedia computer with video-capture card/ equipment, an audio card and with relevant software installed
- A video input source (VCR, Camcorder, Beta cam player etc)
- Necessary cables (prefer S-Video over composite, if you have a choice!)

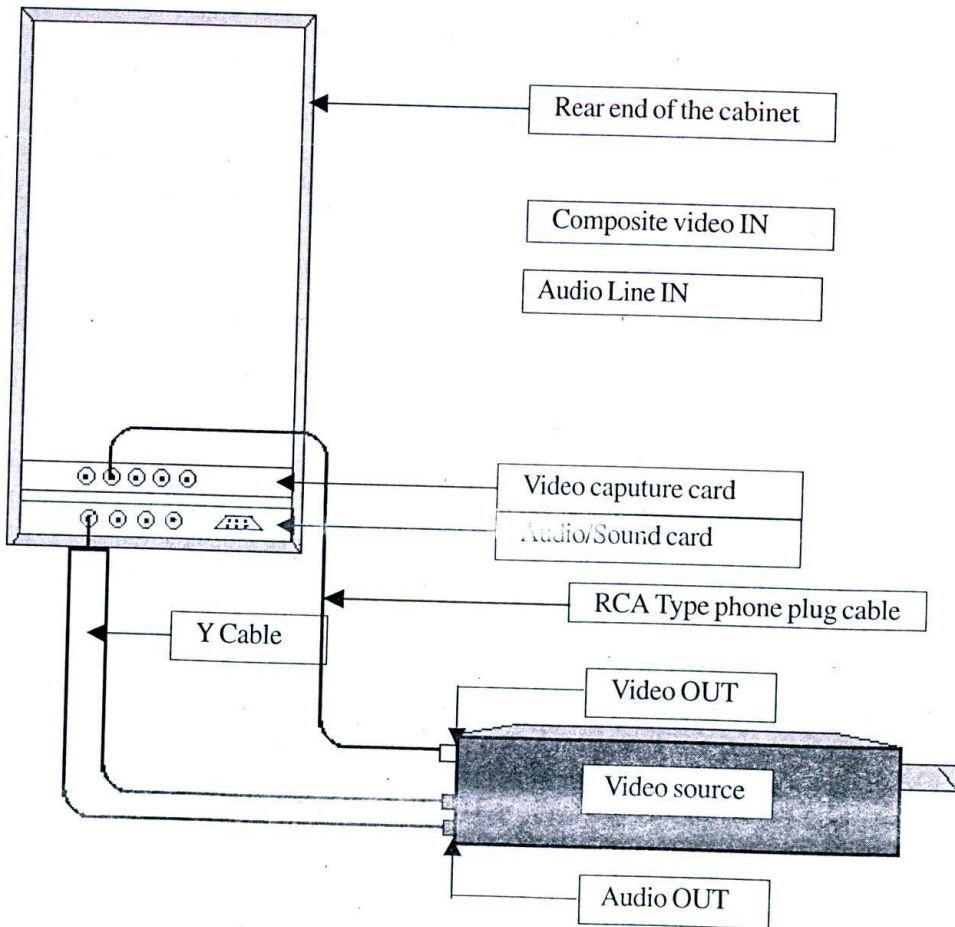


Figure 164: Video capture process detailed

Follow these steps in sequence, to capture video data:

- Connect the 'video out' jack of the input video source to the 'video in' jack of the video capture card, using relevant cables.
- Connect the 'audio out' jacks of the video source to 'line in' jack of the audio card. If your video equipment is giving out stereo audio (the two channels plugs are distinguished by two different colours) then you need to have a special 'Y' cable - that accepts 'audio out' from the left and right channels of the equipment and feeds them into the audio card.
- Play back the recorded tape from the video source. If your connectivity is correct, you can see the video - probably in a smaller window - in the digital video capture software window you are using.
- Fixing up the relevant capture parameters like the screen capture dimensions, compression ratios etc.
- Press the 'capture' button. The video data will be recorded onto the hard disk. This recorded file can be later saved in the required digital video file format.

19.4.3 Video capture file format

You might think that you can actually choose from various file formats available for capture. But this is not entirely true.

The problem arises because of encoding and post-production.

Always remember that encoding is the final process and should be done only after completing all post-production work. This is because of the fact that encoding applies compression algorithms over the digital video files.

If post-production work has to be performed over videos, it is better that we do it over uncompressed files. Otherwise, the videos will be subject to double compression - resulting in severe loss of quality.

Is there a problem with this? Yes, there is.

Since the captured video data has to be stored as uncompressed raw data, it will consume enormous space and will demand extensive random memory for smooth operations. In fact, even file formats like AVI cannot hold data more than 1 GB or so and we need to use other file formats like DV to handle such voluminous data in uncompressed form.

19.5 Tips for optimization and maintenance

If you are doing frequent digital video handling, here are a few tips for maintenance:

- It's better to reserve dedicated space for video buffers in your hard disk and use the same for all temporary video files. Apart from ease of maintenance, this allocation has yet another advantage: During disk defragmentation it saves considerable of time.
- Do not make use of compression utilities such as drive space for compressing this allocated space - because, they tend to slow down the video performance. Instead, make use of third party compression programs such as WinZip or PKZip to compress those files that have already been captured and saved. These programs are very efficient - much more than those that claim to double your disk space - and the compression that can be achieved is also of the highest order. This process results in considerable disk space saving - enough to cope up with day to day working. These compression programs also provide options to combine more than one video file into a single compressed .zip file - so that you may not have to muddle with too many compressed files. One disadvantage of this method, however, is that the files have to be uncompressed every time before viewing.
- Do disk scan and defragmentation of hard drive - at least once in a week, if you are frequently capturing and editing video data. (Defragmentation is the process of consolidating the file clusters containing the data as well as the empty clusters. For procedure on how to defragment your hard disk, refer Windows help). Disks that are frequently scanned for errors have much lesser chances of crashing down under heavy read/write operations.

- All video capture applications are memory hungry. Ensure that you have at least 256 MB of RAM. Also, ensure that you have allotted enough swap file space for the Windows operating system.
- Windows 2000 adjusts the swap file and temporary file space as and when required. But when it increases the file space, all operations may be suspended for considerable amount of time. Please do not disturb this process – wait till the operating system completes its task and the performance will improve from then onwards.
- Store all the back up files and other resources on a CD-R / CD-RW disc so that they can be brought back to the life, when the need arises. Keep only those files that are required for the current projects, on the hard disk.
- Finally, make use of higher capacity hard disk - Minimum 20 GB in case you are frequently muddling with digital videos. Because, you need a lot of disk space before editing and encoding the video data files.

19.6 Digital video post-production

Digital video post-production is the process of editing and mixing videos within the computer, using relevant software tools. Video post-production has grown over these years into a multi-million dollar industry.

There are many things you can do during post-production. Some of them are:

- Adding, removing and rearranging different portions of the video clippings shot
- Resizing video
- Mixing and remixing audio
- Editing colour, blend, lighting and other attributes of video
- Adding special effects / titling etc
- Interlacing 3D animation with live video shoots
- Interlacing still photographs with live videos

To do all this, you need rugged video post-production software that is rich in features. There are quite a number of post-production suites available in the market – like Adobe Premiere and Ulead Video studio. Before we could put our hands on these software suites, we need to learn certain fundamental concepts about video post-production that will help us to understand and appreciate various options available in the suite.

I've taken particular pains to present only the generic concepts so that they will be useful to you, irrespective of the tool you are going to use, later.

19.7 Post-production concepts

In this section, we will be uncovering some of the fundamental concepts associated with digital video editing.

Why concepts - without delving directly into the tool?

Because tools change over time, but concepts mostly remain in place. Rather than learning how many menus and options are available in any multimedia tool, a novice should understand the fundamental concepts that make up the tool. Later on, when time comes wherein he or she has to migrate to a different tool this learning will be of great use.

19.7.1 Understanding video clippings

In the world of video editing, we learn to conceive a lengthy video shot as a sequence of short clippings. Let me illustrate this with a mini video project we did for Tourist's India CD-ROM.

For a feature on Madurai, a temple city in south India, we had shot quite a lengthy video clipping. Now, we could not show all that we had shot for half an hour because the slot allotted to Madurai was just three to five minutes! Hence we had to pick out some of the best sequences we had shot and arrange it in a sequence.

We decided to illustrate just the main temple within the time slot. This temple was most famous for its temple towers rising on all the four sides of the temple – studded with colourful images of gods and goddesses. Now this process of prioritising what you really want to present, is very important. When half an hour video is edited to just three minutes, you can afford to show only the best and most important details.

The following sequences were selected from the lengthy clipping:

- Temple entrance and temple towers – outer view .
- Temple tower – zooming in
- Details of statues studded in temple tower
- Temple entrance – people moving in
- Temple interiors and stucco decorations
- Temple walls

We actually did a few more, but these are enough for our illustration.

Now, all we had to do was to cut out the sequences we want - from the rest of the video clip. Video post- production suite allowed us to do this by means of a cut operation.

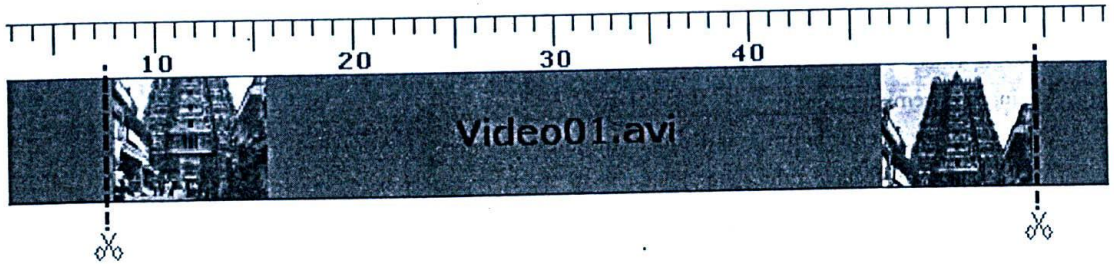


Figure 165: Cut operation can be performed using post production tools

All video suites will display the original video clipping (say video00.avi) as a series of bitmaps that stretch across the timeline – as shown in the figure. What we did was to specify the starting point and end point of the clipping and the rest of the video was removed. We saved the first clipping as Video01.avi. Repeating this operation for different clippings across the original video, we ended up with six different sequences of small clippings – just containing the shots we wanted to display.

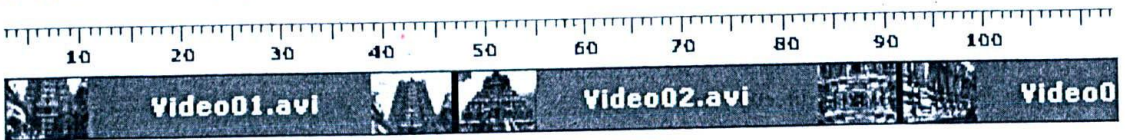


Figure 166: Different video clippings arranged in sequential order – in the post-production suite

The second task was to arrange those clippings in the order we want and to make the integrated shot as a single video clipping. This was also easily achieved using the video suite – all we had to do was to import the necessary video clips in proper order and place them next to one another. During rendering, the suite will integrate all these independent clippings into one single video.

19.7.2 Concept of video and audio tracks

In the earlier illustration, we made one important assumption. We assumed that all the different clippings were coming from the same source movie video00.avi. What if the assumption is not correct? What if the clippings we need

come from different sources? Are we to open and cut clippings each and every movie and save it? That could be a cumbersome and time-consuming process...

Video production suites offer a solution to this by means of video tracks. Theoretically, we can compare this concept of tracks with that of layers in image editing software tools. According to this concept, each video editing project can consist of multiple video and audio tracks. Video tracks will contain just the visual information and audio tracks will contain the corresponding audio information.

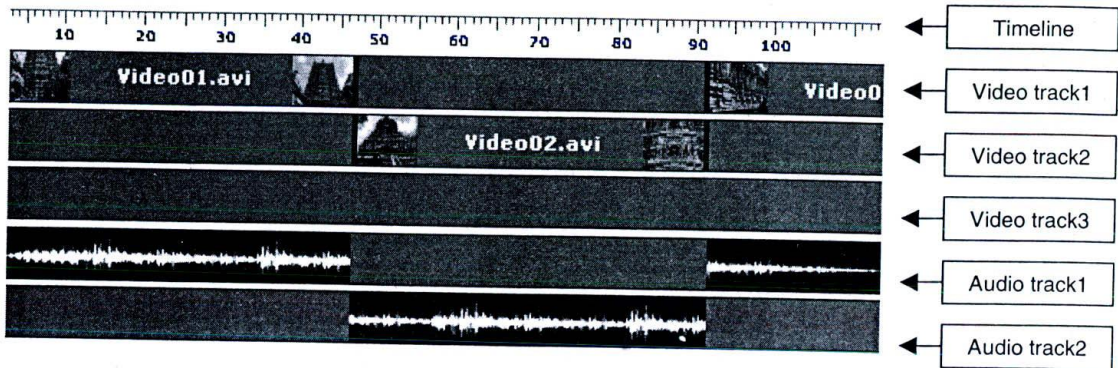


Figure 167: Multiple tracks of video and audio data can be combined together in video production suite environments

Each of these tracks can contain information from different files. For example, in a single project, we can have clippings coming out of different video source files. During video rendering process, the output of all these different tracks will be merged together.

Do note that video02 begins where video01 ends and video03 begins where video02 ends. If there is any overlap between the videos, the top most video will override all others – just as in layers – unless we define some special effect options.

19.7.3 Video special effects

Till now, it all looks like a neat little business: Cut different portions of video you want and stitch them as a single clip. Fine. How about some special effects? How about those dissolve and blind effects between the clippings? What if the first video is to fade into the second in a seamless manner?

In the world of digital video terminology, these effects are called transitions.

Transitions can be applied between two different video clippings. For example, in the above example, video01 stops at some point of time and video02 begin. Normally, the shift will be sudden and spontaneous – but if you want to smoothen out, you can apply a transition between these two clippings at some point of time when video01 ends and video02 starts.

In order to apply transition effects, some portion of video01 as well as video02 has to be sacrificed.

Let us say we want to blend the last five seconds of video01 with the first five seconds of video02. The two seconds of video clip should be kept one over the other - so that, in the timeline, there are at least five seconds in which both clippings interlace.

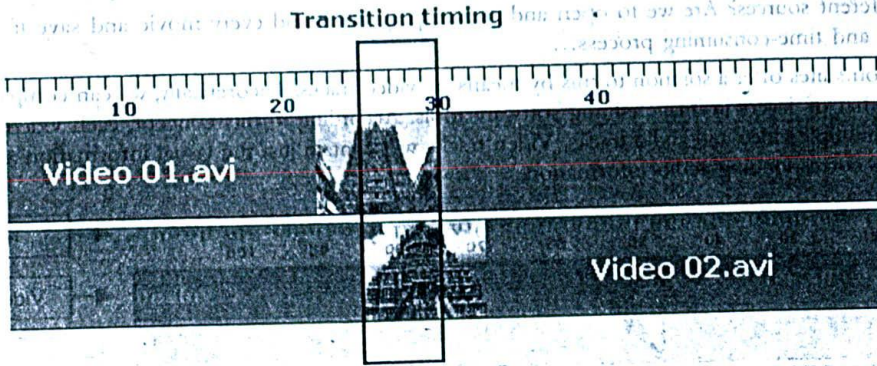


Figure 168: The five second interlacing gives us room to apply some transition effects between the clippings

Depending upon the video suite you are using, you can choose from many different transition effects – right from blinds, fade-in, fade-out and dissolves to more sophisticated deformations.



Figure 169: Fade in transition effect applied between video01 and video02

19.7.4 Image pans

Image panning is the process of treating the output window as a camera and making movements across the video. It is best for generating wonderful video clippings out of still images.

Let me illustrate this with an example.

Let us say we have the still photograph of an ancient and yet beautiful statue. You can very well feature this as an image in your project – but let us say you want to show this as part of your video clipping on, say, the architecture of ancient India. What you want to show is the complete details of this figure – inch by inch.

Would it not be nice, if you could pass the camera over the statue from top to bottom?

Well, that is exactly what image pan is all about. Using the utilities available in post-production suite, you can define the size of the camera window you are going to run over the still image as well as the direction of the camera movement.

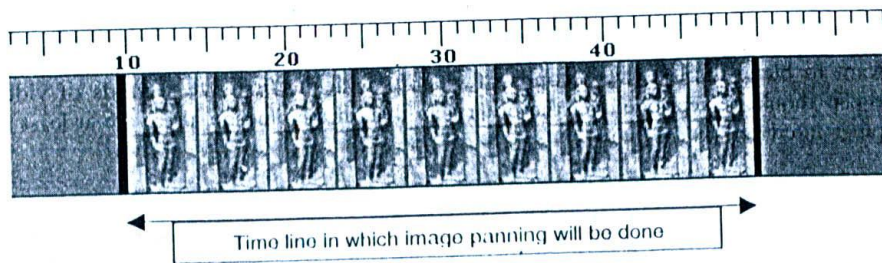


Figure 170: The still image is copied multiple times over the video track to provide working space for the camera panning

To do image panning, you first need to copy the still image over the video tracks multiple times – across the timeline. This will give you a virtual video clip over which you can run the camera.

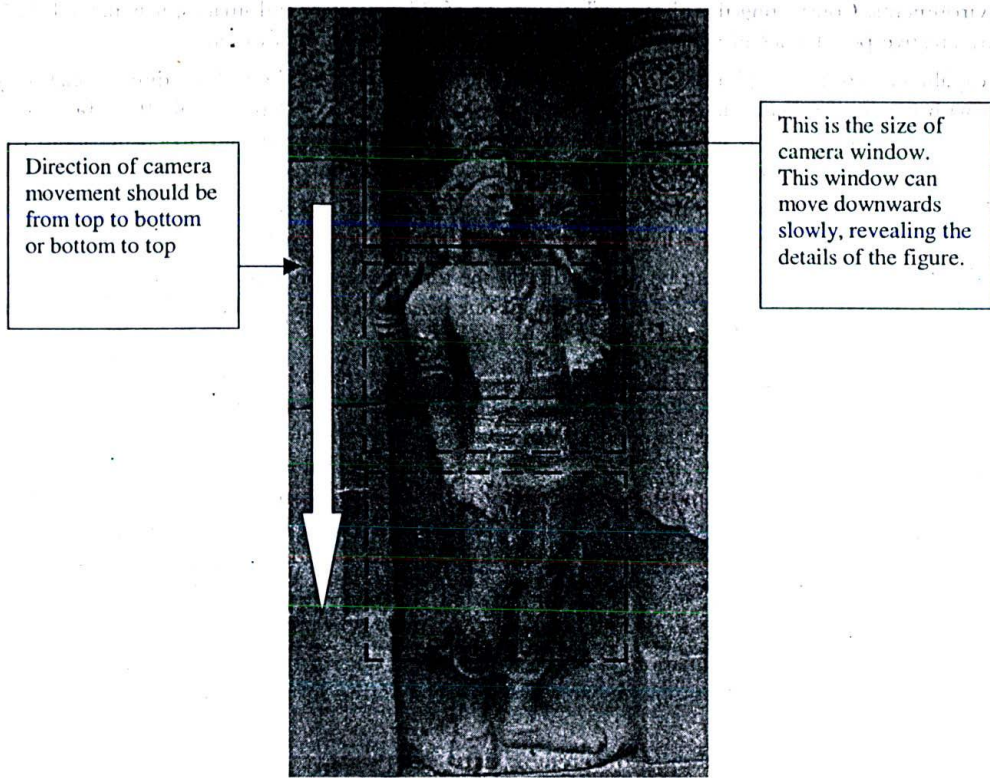


Figure 171: Image pan effect can be used to provide a bit by bit coverage of this beautiful statue in a video clipping

Once the video clip is ready, we can actually apply the image panning special effect over the video clip and achieve the desired results. The speed at which the camera moves will be determined by the timeline allocated for the panning process. If the camera movement is too slow, reduce the timeline; and if it is very fast, increase the timeline by adding a still images for a few more seconds.

Apart from moving from top to bottom and left to right, some suites also allow you to do other operations with image pan like zoom in / zoom out and deformations. Putting it all together, image pan can be a very effective tool at the hands of a skillful video composer.



Figure 172: Resulting frames of image pan effect

19.7.5 Mixing videos with animation

We saw earlier that two-dimensional and three-dimensional animations can be developed using specialized packages and environments. Considering the photo realistic nature of 3d characters and images, it is natural that there might be many creative possibilities in which the both have to be mixed with each other.

These capabilities are best exploited in feature films. For example, we saw how three-dimensional dinosaurs could interact with live human beings in the Jurassic Park movie series. The so called 'special-effect' breed of movies that are abound today, heavily rely upon the capabilities of three-dimensional software to create photo realistic scenes and the ability of video tools to integrate them seamlessly with live footages.

We have already discussed how to model and render characters and objects in a three-dimensional environment. Here we will just focus on mixing a live video footage with animation clippings.

The mixing we are talking about can be done either in the three-dimensional environment or using post-production video suites. Which option is better? I'd prefer the first one because it is less cumbersome and often results in decent output.

Most three-dimensional utilities provide room for defining bitmaps and videos for the background. Care should be taken to ensure that the size and nature of the video clippings blends well with the objects and/or characters being animated. Lighting and materials play a critical part in making the viewers believe that the three-dimensional objects are natural and not computer generated. Do a trial rendering and see if the results are satisfactory. Mostly, you will be caught only in materials – as most animators tend to make their objects rather very shiny. In a pure three-dimensional animation, it may not look bad, but when interlaced with a live footage, the differences tend to be rather obvious. If possible, use advanced renderers with facilities like radiosity - that will improve the quality of renderings.

If you are left with no choice, but to do the blending via a video post-production suite, then follow these steps:

- Render the 2D or 3D animation as a series of bitmaps, adopting a standard colour for the backgrounds that are going to be superimposed with live footages. If the software permits, maintain the background transparent.
- Import the bitmaps into the video suite in a video track – above the life footage.
- If the bitmaps are transparent, the underlying video is exposed through the gaps. Otherwise adopt the chroma-keying technique to cut off all the unwanted colours in the bitmaps. This could turn out to be a rather cumbersome and time-consuming process if you do not have the right set of tools.
- Once the transparency is completed render the final output and check the results.

19.8 Adobe premiere video post-production suite

Adobe premiere is one of the most famous tools for video post-production, particularly on the windows platform. The tool is from Adobe Inc. (<http://www.adobe.com>), the creator of some of the frontline multimedia editing tools like Photoshop, Illustrator and Acrobat.

Premiere, as a post-production solution is pretty complex with numerous options and control panels. What we will be presenting here is, but a brief preview of the product – enough to wet your hands and get going. Most importantly, we will be concentrating on some of the concepts we learnt in the earlier pages.

The version we will be using for illustration is version 5.0 and it is not the very latest. But it is enough to illustrate all the concepts we had discussed earlier. For details about the latest version premiere pro, please log on to <http://www.adobe.com>.

19.8.1 Project options

As you open the premiere application, you will be asked to choose the settings for the new project. These settings and options alone are enough to confuse you for a lifetime!

There is nothing much to worry about, in this dialog box. All it says is that your video settings will be of size 640*480 (which is the default), using cinepak as the codec algorithm, with millions of colours and 100% quality (best). The audio settings indicate that the audio currently being used is of frequency 44.1 KHz and is of size 16-bit stereo – considered to be very good. The time base indicates that you are working on NTSC standard – which is 30 frames per second.

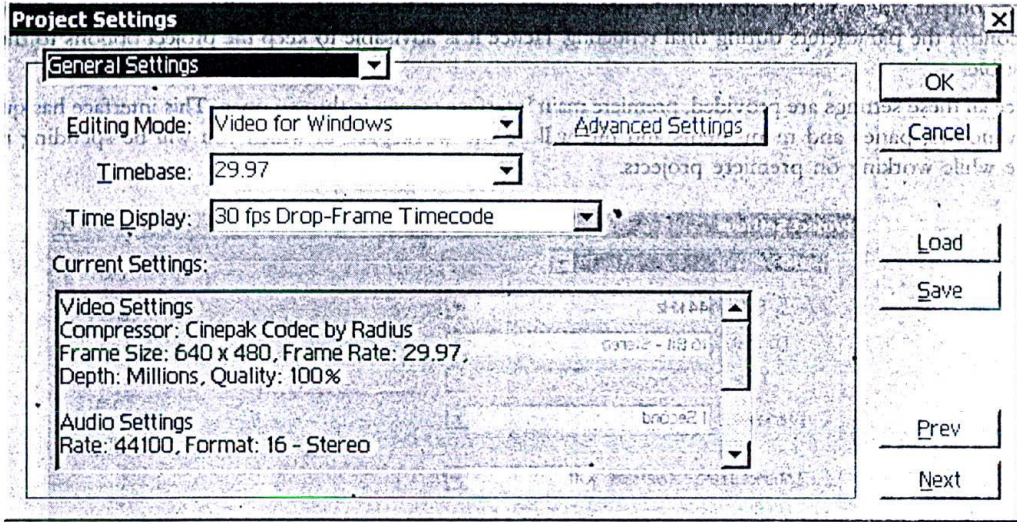


Figure 173: Premier project – general settings

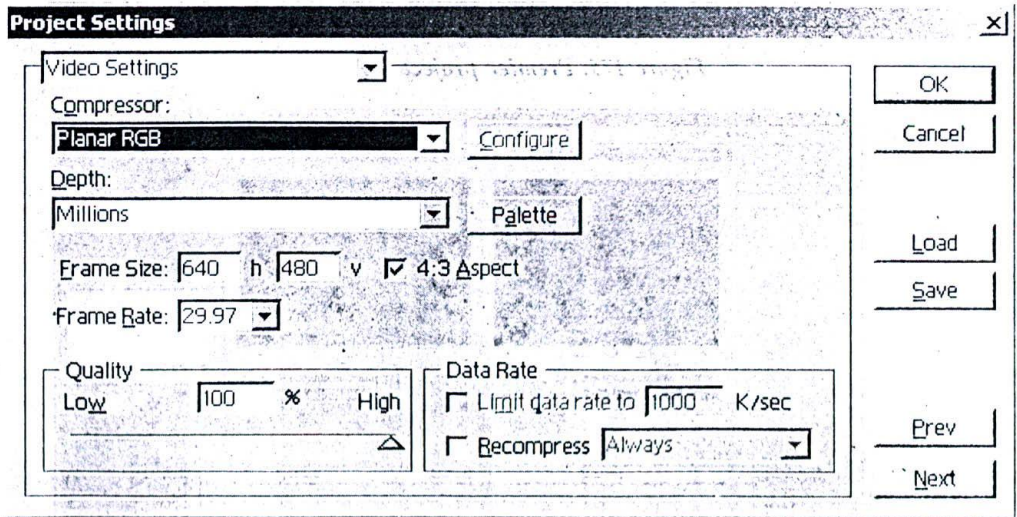


Figure 174: Premier project – Video settings

If you want to change these default settings, click the general settings drop down box and choose the panel you want to change. For example, if you choose the video settings, you are presented with the option of changing the default video size, codec algorithm, number of colours etc. You should carefully choose these options to represent

the requirements of your project. For example, if your source videos are of 320*240 size, then there is no point working with a size of 640*480 and you may decide to change this parameter.

Similarly, under audio options, you can choose to increase or decrease various parameters that control the quality of audio.

One very important thing to remember is that these are just project options and not the options that must be applied to the output video. While exporting the project as a movie in final stages, we will be presented with enough options to control the parameters during final rendering. Hence it is advisable to keep the project options to the best quality possible.

Once all these settings are provided, premiere main interface screen is thrown open. This interface has quite a number of windows, panes and menu items and this will be the workspace in which you will be spending most of your time while working on premiere projects.

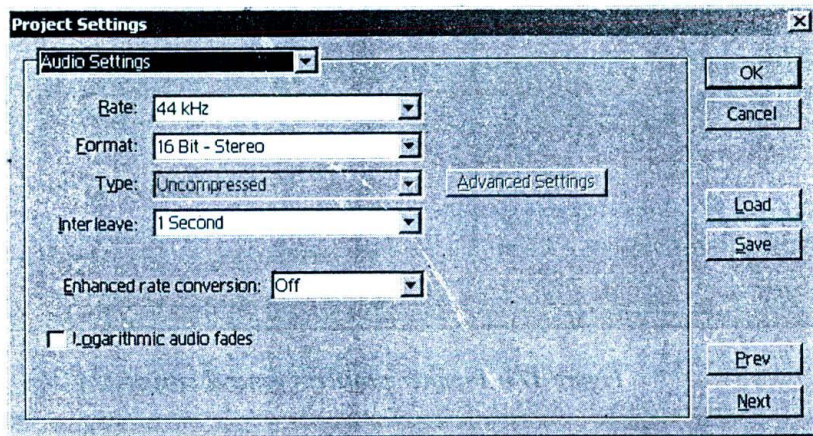


Figure 175: Premier project – Audio settings

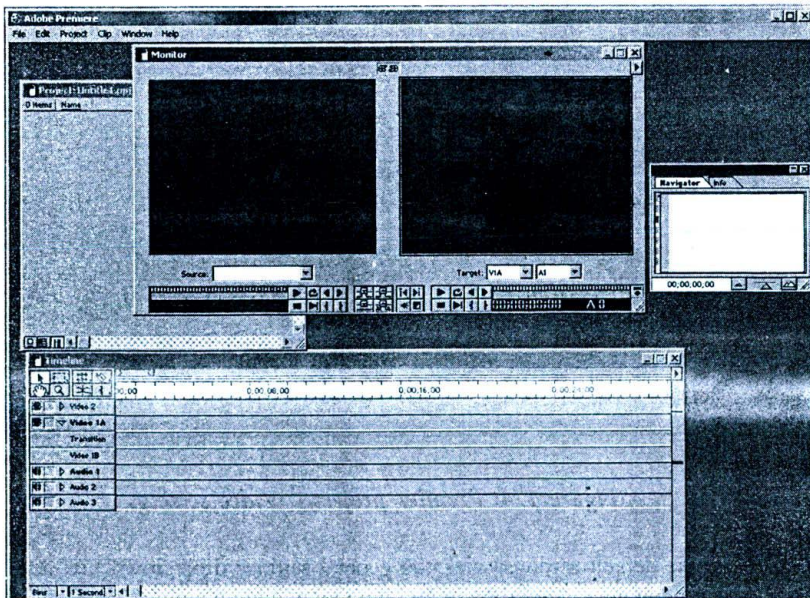


Figure 176: Premiere – Main interface

19.8.2 Timeline & assets

Look at the main interface of adobe premiere.

The timeline window in the bottom will be the one you will be using most – in fact, all other panels are only meant to assist the activities happening in the timeline. The different audio and video tracks, which we discussed in the concepts section, can be seen in the time line. Take particular note of the transition track amidst the video tracks – all transition options are to be defined here.

Before you begin, save the project as it is under any given name. This project file will contain references to all the audio and video clippings you are using in the project.

To begin with, you need to import all the necessary raw videos and audios into the project. In the file menu, select Import à File and then choose the files you want to bring into the project, one by one. Mostly you will be importing video files, audio clippings and adobe Photoshop image files. Once these files are imported, they are available as assets in the project panel. But note that they have just been imported into the project – they have not been set against the timeline. It is you, who will be doing these arrangements in the required order.

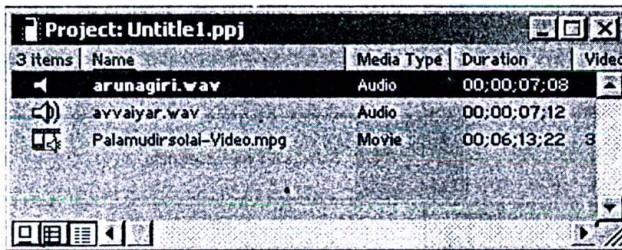


Figure 177: Few of the audio and video files imported into the current project

Once you have imported all the required files, the task of compiling the video and audio begins. Drag and drop the required video clippings into the timeline. The audio element that is tagged along with the video will be imported into corresponding audio tracks. You can either choose to use this audio or can replace the audio with some other clippings.

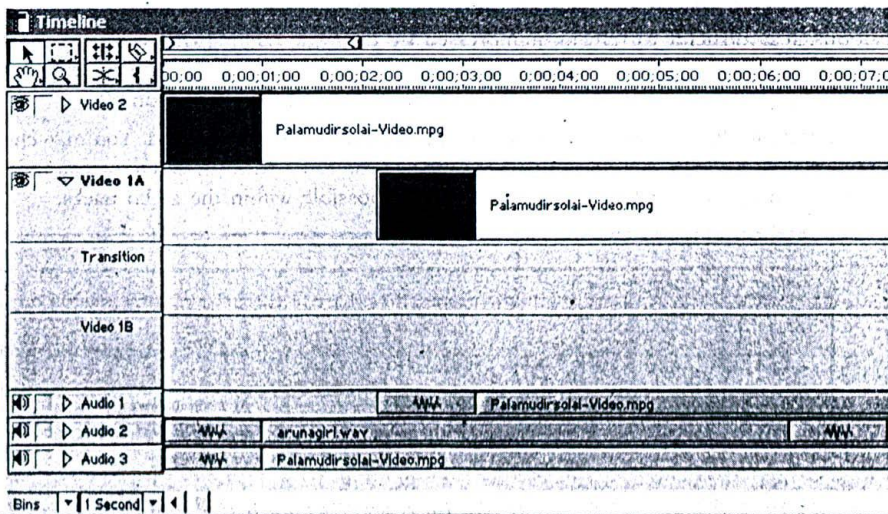


Figure 178: Video and audio clippings arranged along the timeline

In the picture showing video and audio clippings along the timeline, you see two raw video clippings and few other audio clippings being arranged in the timeline panel. Can you see any reason why the same video has been imported twice?

Remember that the videos we are importing are raw videos. We might want to take a clipping from the first few minutes and another clipping from the next few minutes. So, from the same raw video, you will be extracting several clippings and arrange them along the timeline. Remember our earlier example about the temple video – we actually chose six sequences spanning few seconds to few minutes, from a raw video of half an hour.

Thus you will find that the same clip has to be dragged down into the timeline multiple times and cut to required lengths. Now, if we were to apply some transitional effects across the clippings, it is best that we import them in two different video tracks. Once we have two videos interlacing each other, it will be possible to apply some transitions between them. This is what is shown in the figure.

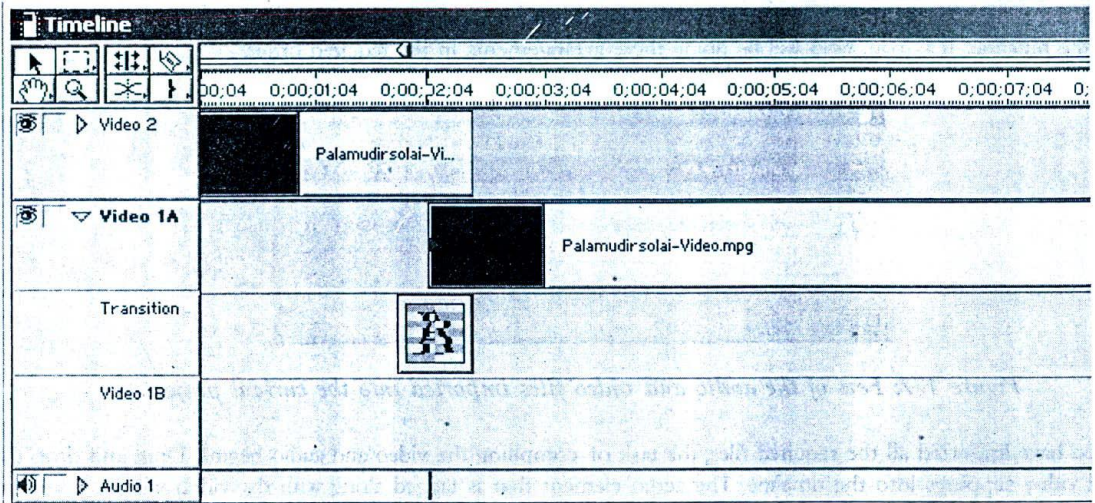


Figure 179: Transitions being applied between the videos

Talking about transitions, it is difficult to remain unimpressed by the wide-ranging transition effects provided by adobe. Almost all possible transitional effects that can be thought of have been included. Each effect, when applied over the transition track, opens out a dialog box that lets us control the sequence of mixing.

After arranging all the different clippings in the required order, the audio has to be edited. You may choose to use the audio that was recorded along with the video, decide to replace the same with music etc or you may even want to add a voice over the existing audio. All these combinations are possible within the audio tracks.

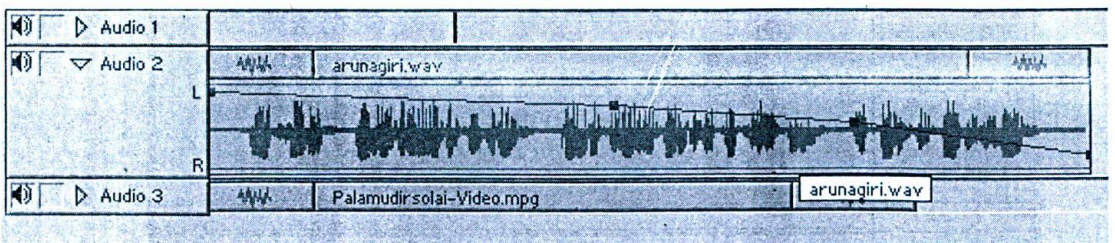
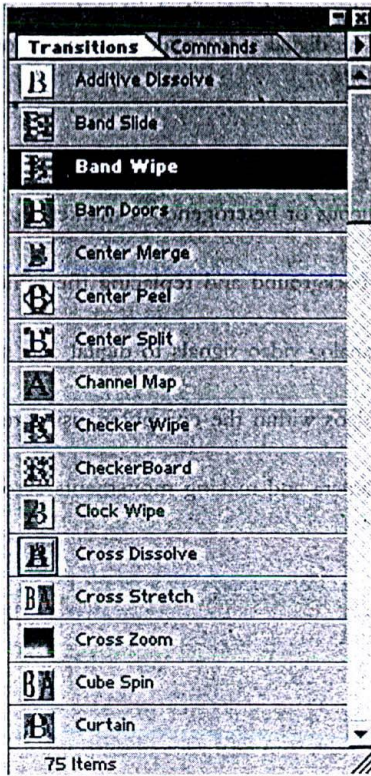


Figure 180: Audio fade-ins and fade-outs can be controlled with the rubber band tool



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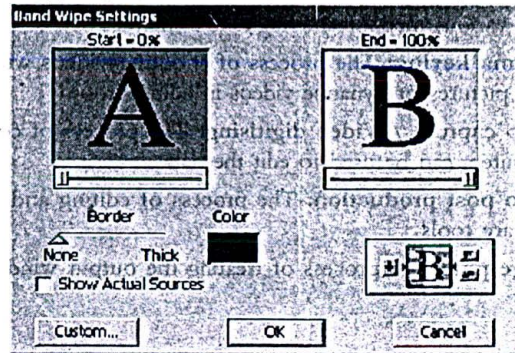


Figure 181: Transition effect options available. Each effect opens out a dialog box as shown here, which allows you to control the degree of transitions

As you expand the audio tracks (with the help of the small triangle near the wordings Audio2), you can see a red line going through the waveform. This is actually a rubber-band tool, which is most useful for providing effects like fade-in and fade-outs. Rather than providing a standard fade-in/out with gradual control of volume, this rubber band based tools provides more control over the volume of the audio clipping.

Premiere also provides a variety of audio filters that can be applied over the clipping. Just right click on the specific clip over the timeline and choose 'filters' option.

Adobe premiere, as a post-production solutions, is pretty advanced tool and there are many more operations and capabilities to be learnt. But we have to stop here since it is meant to be a preview, rather than an extensive discussion on the tool. Those who want to proceed further can take up relevant book detailing the capabilities of adobe premiere in depth.

19.9 Summary

Digital video production for multimedia projects consists of shooting the necessary sequences with relevant equipments, capturing and digitising the analog video data, video editing and post production and finally embedding the same into the projects.

Before the shooting process one has to take care of equipments, backgrounds, what are all the camera movements to be used and appropriate lighting required. Video capture can be performed with the help of video capture cards.

Video post-production and editing consists of arranging the required clippings in the desired order and doing appropriate changes on the associated audio. It is possible to super-impose digital video over two-dimensional or three-dimensional animations, with the help of video post-production suites.

19.10 Keywords

- ❑ **Multimedia project:** A typical software project, making use of multimedia technology - with specific aim of disseminating explicit information to a well defined homogeneous or heterogeneous market segment - using various media technologies and interactivity.
- ❑ **Chroma keying:** The process of shooting videos with a blue background and replacing the same with static pictures or dynamic videos in editing room
- ❑ **Video capture / Video digitising:** The process of converting analog video signals to digital data so that computers can be used to edit the data
- ❑ **Video post production:** The process of editing and mixing videos within the computer, using relevant software tools
- ❑ **Image pan:** The process of treating the output window as a camera and making movements across the video