FUNDAMENTAL OF MULTIMEDIA
MULTIMEDIA ELEMENTS : VIDEO

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Course Description

- **Expected Outcomes**

At the end of this lesson you will understand:

- Understand the characteristics and format of video
- Compression of video
- Type of video

- **References**

- Tay Vaughan. Multimedia: Making It Work, Ninth Edition. Mc Graw Hill. 2014. ISBN-13: 978-0071832885.

- Zhe-Nian Li, Mark S. Drew.S & Jiangchuan Liu. Fundamentals of Multimedia (Texts in Computer Science) 2nd ed. 2014 Edition. Springer Publication. 2014. ISBN-13: 978-3319052892.

- Khalid Sayood. Introduction to Data Compression, Fourth Edition (The Morgan Kaufmann Series in Multimedia Information and Systems) 4th Edition. Elsevier. 2012 ISBN-13: 978-0124157965.

- Savage, T.M., Vogel, K.E. An Introduction to Digital Multimedia 2nd ed.. 2013. Jones & Bartlett Learning   ASIN: B00LZM6ESY.

- Parag Havaldar, Gerard Medioni. Multimedia Systems: Algorithms, Standards, and Industry Practices (Advanced Topics) 1st Edition. Cengage Learning. 2011. ISBN-13: 978-1418835941

Introduction

▸ The ability to incorporate digitized video into a multimedia title marked an important achievement in the evolution of the multimedia industry.

▸ Those viewing the video would recognize the impact of seeing the actual event rather than simply reading about it or listening to it.

▸ Video brings a sense of realism to multimedia titles and is useful in engaging the user and evoking emotion.

What is video?

▸ **The term *video* commonly refers to several storage formats for moving pictures:**

  ▸ digital video formats, including Blue-ray Disc, DVD , QuickTime and MPEG-4 and analog video tapes.

• **Video can be recorded and transmitted in various physical media:**

  ▸ in magnetic tape when recorded as PAL or NTSC electric signals by video cameras, or in MPEG-4 digital media when recorded by digital cameras.

▸ **Quality of video essentially depends on the capturing method and storage used.**

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PAL

- short for **Phase Alternate Line**
- is an analogue television encoding system used in broadcast television systems in large parts of the world.

NTSC

- named for the **National Television System Committee**
- is the analog television system used in most of North America, most countries in South America, Burma, South Korea, Taiwan, Japan, Philippines, and some Pacific island nations and territories.

PAL vs. NTSC

▸ The PAL standard automatically removes hue errors by utilising phase alternation of the colour signal, so a tint control is unnecessary.

▸ NTSC receivers have a tint control to perform colour correction manually. If this is not adjusted correctly, the colours may be faulty.
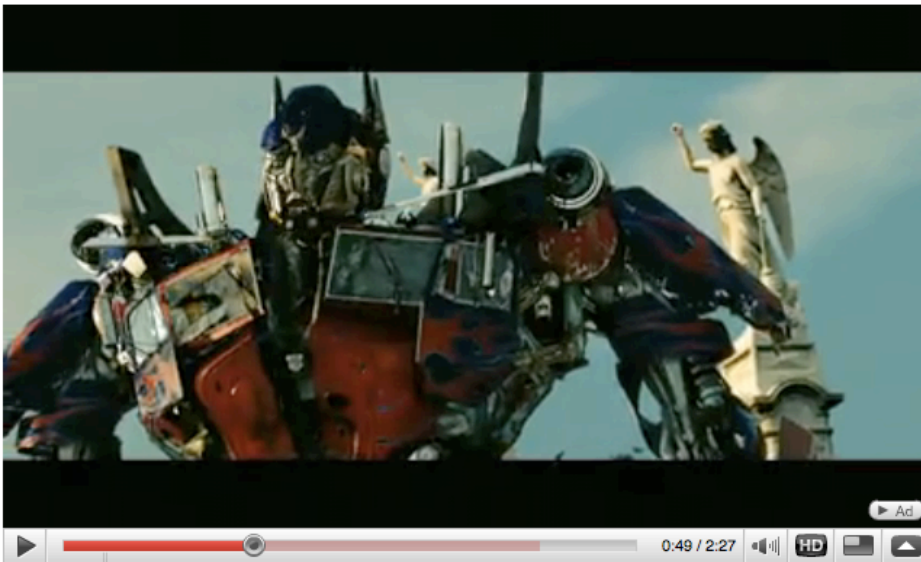
Video in Multimedia

Video can be:
- Live
- Recorded
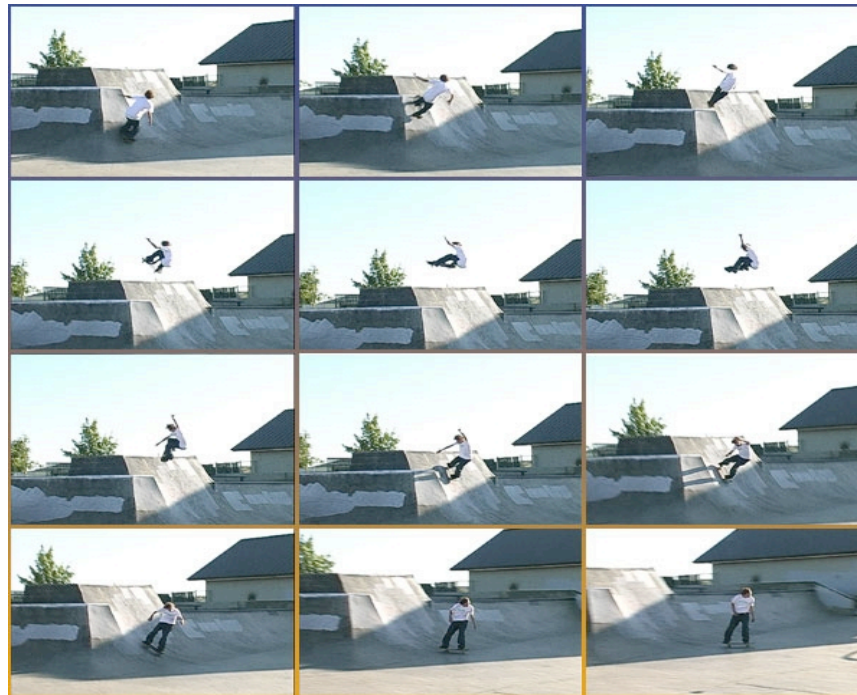
Source:www.youtube.com
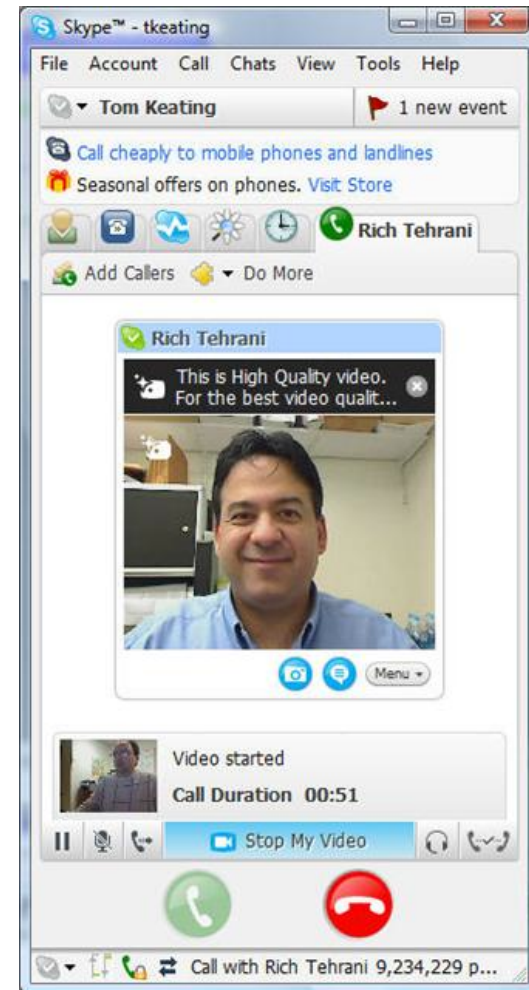
Source: www.skype.com

Video in Multimedia

- requires the highest performance demand
- playback a very large file size of video requires fast data transfer.

Digital Video

Digital video comprises of a series of orthogonal bitmap digital images displayed in rapid succession at a constant rate.

Digitizing the video signal

▶ Video , like sound, is usually recorded and played as an analog signal. It must therefore be digitzed in order to be incorporated into a multimedia title.

Digitizing the video signal

▸ One of the advantages of digitized video is that it can be easily edited.

▸ Digitized video, allows random access to any part of the video, and editing can be as easy as a cut-and-paste process.

▸ Analog video, such as videotape, is lineiar; there is a beginning, middle, and end.

   ▸ If you want to edit it, you need to continually rewind, pause and fast forward the tape to display the desired frames.

File size considerations

▸ **Digitized video can be extremely large.**

   ▸ A single second of high-quality color video can be as large as 1 MB.

▸ **Several elements determine the file size:**

   ▸ Length of the video

   ▸ Frame rate

   ▸ Image size

   ▸ Color depth

File size considerations

▶ Frame rate

  ▶ It is a rapid display of still image

  ▶ Television and movies play at 30 fps

  ▶ Acceptable playback can be achieved with 15 fps

▶ Image size

  ▶ A standard full-screen resolution is 640x480 pixels

  ▶ Video is more appropriately displayed in a window that is one-fourth (320x240 pixels) the size of the full screen

File size considerations

- ## Color depth

  - Digitized video is made up of series of still graphic bitmaps. Hence the quality of video is dependent on the color quality for each bitmap.

  - 8-bit color depth provides 256 colors

  - 16-bit color depth provides more than 64,000 colors

  - 24-bit provides over 16 million colors

▸ Using the formula, you can estimate the file size of 1 second of digitized video:

Fps x image size x color depth/8 = file size

Video Compression

▸ Video compression/decompression, known as *Codec* have been developed because of the large sizes associated with video files.

   ▸ It can substantially reduce the size of the video files.

▸ Two types of compression:

   ▸ Lossless

   ▸ Lossy

Video Compression

▶ **Lossless compression**

   ▶ Preserves the extract image through out the compression and decompression process.

▶ **Lossy compression**

   ▶ Eliminates some of the data ain the image and therefore provides greater compression ratios than lossless compression.

   ▶ The greater the compression ratio, the poorer the decompressed image.

Video Compression

▸ Certain standards have been established compression programs, including:

  ▸ JPEG (Joint Photographic Experts Groups)

  ▸ MPEG (motion Picture Experts Group)

▸ Both of these program reduce the file size of graphic images by eliminating redundant information.

How it works?

▸ JPEG compression

 ▸ It identifies areas and stores them as blocks of pixels instead of pixel by pixel, thus reducing the amount of information needed o store the image.

▸ MPEG compression

 ▸ It looks for the changes in the image frame to frame. Key frames are identified every few frames, and the changes that occur from key frame to key frame are recorded.

 ▸ It can provide greater compression ratios than JPEG, but it requires hardware that is not needed for JPEG compression.

Video Compression

▸ **Two widely used video compression software programs are:**

   ▸ Apple's QuickTime

   ▸ Microsoft Cideo for Windows

Software for capturing and editing video

- Several steps are needed to prepare video to be incorporated into a multimedia title.

- These include capturing and digitizing the video from some video source, such as camera and videodisc; editing and digitized video; and compression the video.

Software for capturing and editing video

▸ Although capturing and compressing are necessary, it is editing that receives the most attention.

▸ Editing digitized video is similar to editing analog video, except that it is easier.

Software for capturing and editing video

▸ **The following are some other features that may be included in editing software programs:**

  ▸ Incorporating transitions such as dissolves, wipes and spins.

  ▸ Superimposing titles and animating them, such as a fly-on logo.

  ▸ Applying special effects to various images, such as twisting, zooming, rotating and distorting.

  ▸ Synchronizing sound with the video.

  ▸ Applying filters that control color balance, brightness and contrast, blurring, distortions , and morphing.

Shooting & Editing Video

- Shooting Platform – the usage of platform to shoot such as environment of shooting.

- Lighting – the usage of light that suitabe with the environment

- Chroma-Key -

- Composition – the arrangement of the video suitable with all the others elements such as music.

Communitising Technology

Video Production

A video production could be categorized into three phases:

- Pre-production (Planning)
- Production (Directing)
- Post-production (Editing)

Pre-Production

Pre-production is the first of the three parts you need to consider when producing any type of video.

During this stage, you're organizing everything so that the production phase goes smoothly.

Pre-Production Checklist

- Make a production schedule
- Crew-Up
- Visualize your project's look
- Find and secure locations
- Casting
- Production design (Discuss among your team)
- Prepare costumes, props set dressing
- Question to ask when developing a shooting script

Pre Production Checklist

- Prepare a floor plan diagram / lighting plot for each location

- Breakdown shooting script

- Storyboard

- Shooting Schedule

Communitising Technology

examples

- http://www.youtube.com/watch?v=LLulnlKd9tc PAL

- http://www.youtube.com/watch?v=Z-RYcvUDSPI NTSC

- http://www.youtube.com/watch?v=oTda4bNR7qY comparing PAL NTSC

- http://www.youtube.com/watch?v=RWgg5-kUSho HDTV