



Fundamentals of Multimedia

2nd Edition 2014

Ze-Nian Li

Mark S. Drew

Jiangchuan Liu

Chapter 1 : Introduction and Multimedia



❖ Content:

I-1: What's Multimedia?

I-2: Multimedia and Hypermedia.

I-3: Overview of Multimedia Software tools



❖ Objectives:

- This chapter considers what multimedia is.
- It also supplies an overview of multimedia software tools, such as video editors and digital audio programs

1.1 The term “multimedia”.

Derived from the word “Multi” and “Media”

- It's the applications that use multiple modalities, including text, images, drawings (graphics), animation, video, sound including speech, and **interactivity**.

1.1 The term “multimedia “.

Or we can say that:


- Multimedia is a combination of text, graphic, sound, animation, and video that is delivered interactively to the user by electronic or digitally manipulated means.

I.I Multimedia and Computer Science

- Graphics, HCI, visualization, computer vision, data compression, graph theory, networking, database systems --- all have important contributions to make in multimedia at the present time.



Components of Multimedia

- 
- Multimedia involves multiple modalities of text, audio, images, drawings, animation, and video.
 - Examples of how these modalities are put to use in ways as diverse as:
 - Video teleconferencing.
 - Distributed lectures for higher education.
 - Tele-medicine.
 - Cooperative education environments that allow schoolchildren to share a single educational game using two mice at once that pass control back and forth.

- Searching in (very) large video and image databases for target visual objects.
- "Augmented" reality: placing real-appearing computer graphics and video objects into scenes.
- Making multimedia components *editable*, allowing the user side to decide what components, video, graphics, and so on are actually viewed and allowing the client to move components around or delete them.
- Using voice-recognition to build an interactive environment.

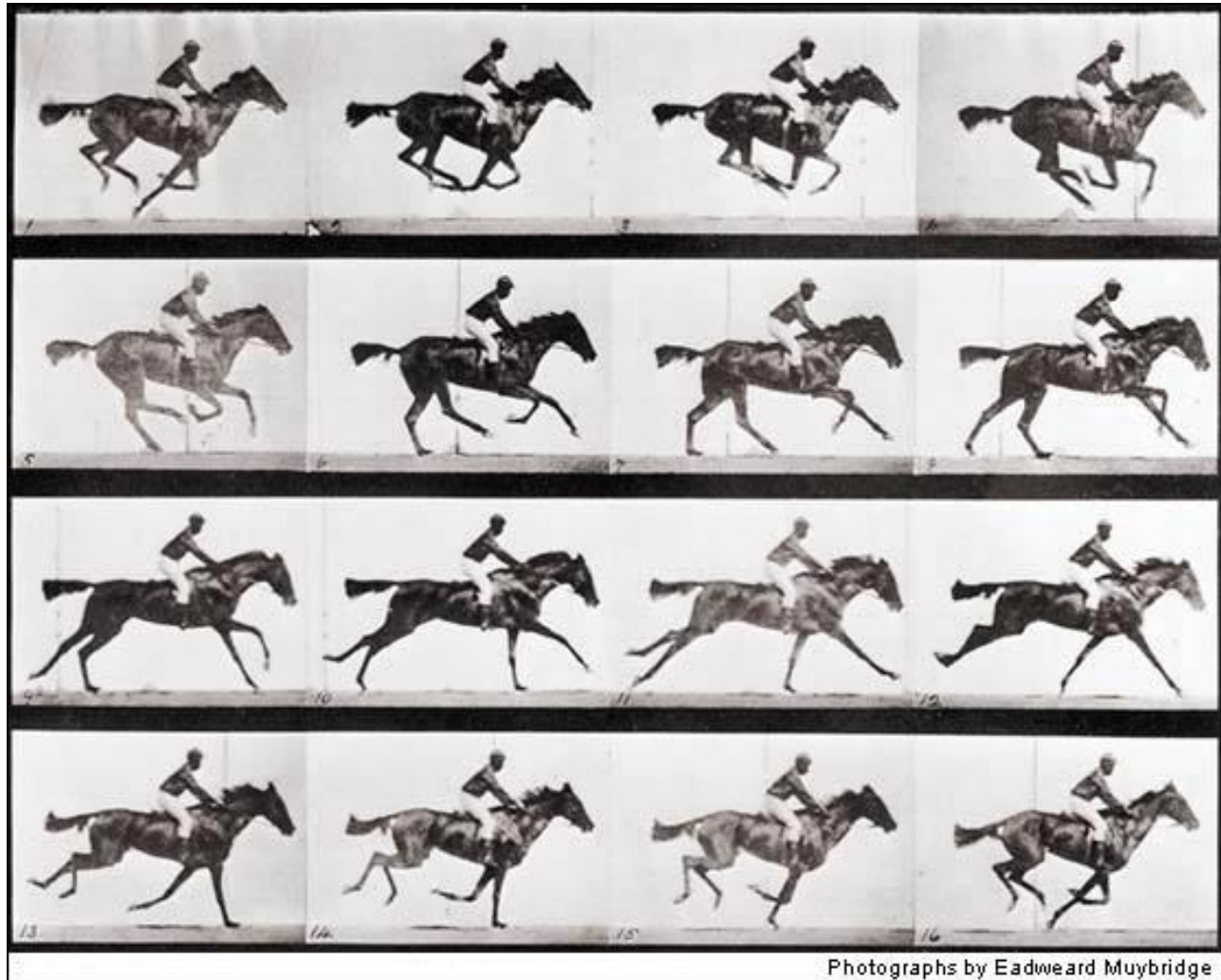
I.2 Multimedia and Hypermedia

To place multimedia in its proper context, in this section we briefly consider the history of multimedia, a recent part of which is the connection between multimedia and hypermedia.

History of Multimedia:

1. **Newspaper:** perhaps the *first mass communication medium*, uses text, graphics, and images.
2. **Motion pictures:** conceived of in 1830's in order to observe motion too rapid for perception by the human eye. –See Picture on Next Slide-
3. **Wireless radio transmission:** Guglielmo Marconi, at Pontecchio, Italy, in 1895.
4. **Television:** the new medium for the 20th century, established video as a commonly available medium and has since changed the world of mass communications.

History of Multimedia:



Photographs by Eadweard Muybridge

History of Multimedia:

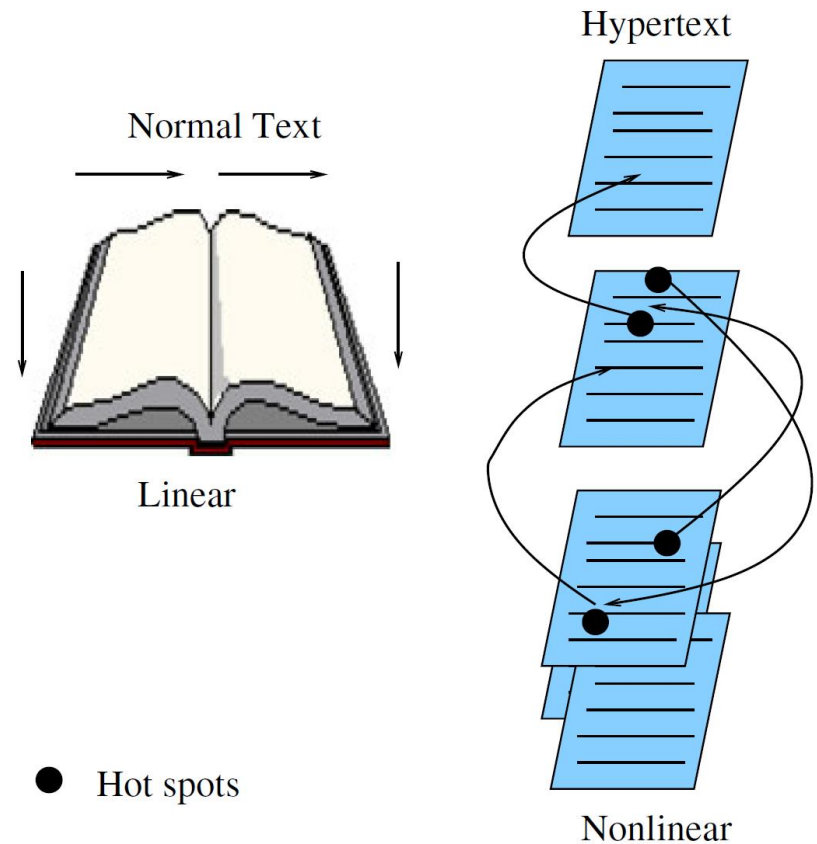
5. The **connection** between **computers** and ideas about **multimedia** covers what is actually only a short period:
- 1945 - Vannevar Bush wrote a landmark article describing what amounts to a hypermedia system called **Memex**. *Memex was meant to be a universally useful and personalized memory device that even included the concept of associative links - it really is the forerunner of the World Wide Web.*
 - 1960 - Ted Nelson coined the term hypertext.
 - 2000 - WWW size was estimated at over 1 billion pages.

Hypermedia and Multimedia

- A **hypertext** system: meant to be read nonlinearly, by following links that point to other parts of the document, or to other documents –See Figure I-1 on Next Slide-
- **HyperMedia**: not constrained to be text-based, can include other media, e.g., graphics, images, and especially the continuous media | sound and video.
 - The World Wide Web (WWW) | the best example of a hypermedia application.
- **Multimedia** means that computer information can be represented through audio, graphics, images, video, and animation in addition to traditional media (text and graphics).

Hypermedia and Multimedia

Fig. 1.4 Hypertext is nonlinear



SMIL (Synchronized Multimedia Integration Language)

- **SMIL**: pronounced "smile" -- a particular application (Extended) of XML that allows for specification of interaction among any media types and user input, in a temporally scripted manner.

SMIL

- ***Purpose of SMIL:*** it is also desirable to be able to publish multimedia presentations using a markup language.
- A multimedia markup language needs to enable scheduling and synchronization of different multimedia elements, and define their interactivity with the user.
- SMIL 2.0 is specified in XML using a modularization approach similar to the one used in xhtml. All SMIL elements are divided into modules - sets of XML elements, attributes, and values that define one conceptual functionality.

SMIL

- Basic elements of SMIL as shown in the following example:

```
<!DOCTYPE smil PUBLIC "-//W3C//DTD SMIL 2.0"
"http://www.w3.org/2001/SMIL20/SMIL20.dtd">
<smil xmlns="http://www.w3.org/2001/SMIL20/Language">
<head>
<meta name="Author" content="Some Professor" />
</head>
<body>
  <par id="MakingOfABook">
    <seq>
      <video src="authorview.mpg" />
      
    </seq>
    <audio src="authorview.wav" />
    <text src="http://www.cs.sfu.ca/mmbbook/" />
  </par>
</body>
</smil>
```

SMIL

- Explanation of the Previous Example:
 - A SMIL document can optionally use the `<!DOCTYPE ...>` directive to import the SMIL DTD, which will force the interpreter to verify the document against the DTD.A.
 - SMIL document starts with `<smil>` and specifies the default namespace, using the `xmlns` attribute.
 - The `<head>` section specifies the author of the document.
 - The body element contains the synchronization information and resources we wish to present.
 - In the example given, a video source called "authorview.mpg", an audio source, "authorview.wav", and an HTML document at "http://booksite.html" are presented simultaneously at the beginning. When the video ends, the image "onagoodday.jpg" is shown, while the audio and the HTML document are still presented. At this point, the audio will thank the listeners and conclude the interview.

I.3 Overview of Multimedia Software Tools –Quick Scan-

- software tools available for carrying out tasks in multimedia are:
 1. Music Sequencing and Notation
 2. Digital Audio
 3. Graphics and Image Editing
 4. Video Editing
 5. Animation
 6. Multimedia Authoring

I. Music Sequencing and Notation

- **Cakewalk:** *now called Pro Audio.*
 - The term sequencer comes from older devices that stored sequences of notes ("events", in MIDI [**Musical Instrument Digital Interface**] –music language-).
- **Cubase:** another sequencing/editing program, with capabilities similar to those of Cakewalk. It includes some digital audio editing tools.
- **Macromedia Soundedit:** mature program for creating audio for multimedia projects and the web that integrates well with other Macromedia products such as Flash and Director.

2. Digital Audio

- tools deal with accessing and editing the actual sampled sounds that make up audio:
- **Adobe Audition** (formerly **Cool Edit**) is a powerful, popular digital audio toolkit that emulate a professional audio studio, including multitrack productions and sound file editing, along with digital signal processing effects.
- **Sound Forge** Like Audition, Sound Forge is a sophisticated PC-based program for editing WAV files.
- **Pro Tools:** a high-end integrated audio production and editing environment . It offers MIDI creation and manipulation; powerful audio mixing, recording, and editing software.

3. Graphics and Image Editing

- **Adobe Illustrator:** a powerful publishing tool from Adobe for creating and editing vector graphics, which can easily be exported to use on the web.
- **Adobe Photoshop:** the standard in a graphics, image processing and manipulation tool.
 - Allows layers of images, graphics, and text that can be separately manipulated for maximum flexibility.
 - Filter factory permits creation of sophisticated lighting-effects filters.
- **Macromedia Fireworks:** software for making graphics specifically for the web. It includes a bitmap editor, a vector graphics editor, and a JavaScript generator for buttons and rollovers.
- **Macromedia Freehand:** a text and web graphics editing tool that supports many bitmap formats such as GIF, PNG, and JPEG.

4. Video Editing

- **Adobe Premiere:** an intuitive, simple video editing tool for nonlinear editing, i.e., putting video clips into any order.
- **Adobe After Effects:** a powerful video editing tool that enables users to add and change existing movies. Can add many effects: lighting, shadows, motion blurring; It also allows layers, as in Photoshop, to permit manipulating objects independently.
- **Final Cut Pro:** is a video editing tool offered by Apple for the Macintosh platform. It allows the capture of video and audio from numerous sources, such as DV.
 - It provides a complete environment, from capturing the video to editing and color correction and finally output to a video file or broadcast from the computer.

4. Video Editing

- **CyberLink PowerDirector:** PowerDirector produced by CyberLink Corp.
 - is by far the most popular nonlinear video editing software.
 - It provides a rich selection of audio and video features and special effects
 - easy to use.
 - It supports all modern video formats (AVCHD 2.0, 4K or Ultra HD, and 3D video)
 - It supports 64-bit video processing
 - it is not as “programmable” as Premiere.

5. Animation

- **Multimedia APIs:**

-Java3D: API used by Java to construct and render 3D graphics, similar to the way in which the Java Media Framework is used for handling media files.

-DirectX : a Windows API that supports video, images, audio, and 3D animation, is the most common API used to develop multimedia Windows applications, such as computer games.

-OpenGL: the highly portable, most popular 3-D API.

5. Animation

- **Animation Software:**

-3D Studio Max: rendering tool that includes a number of very high-end professional tools for character animation, game development, and visual effects production.

-Softimage XSI: a powerful modeling, animation, and rendering package used for animation and special effects in films and games.

-Maya: competing product to Softimage; as well, it is a complete modeling package.

-It features a wide variety of modeling and animation tools, such as to create realistic clothes and fur. Autodesk Maya runs on Windows, Mac OS, and Linux.

5.Animation

- **GIF Animation Packages:**

- For a much simpler approach to animation that also allows quick development of effective small animations for the Web, many shareware and other programs permit creating animated GIF images.

- GIFs can contain several images, and looping through them creates a simple animation.

- Linux also provides some simple animation tools, such as **animate**.

6. Multimedia Authoring

- Tools that provide the capability for creating a complete multimedia presentation, including interactive user control, are called **authoring** programs.

-Macromedia Flash: allows users to create interactive movies by using the score metaphor, i.e., a timeline arranged in parallel event sequences.

-Macromedia Director: uses a movie metaphor to create interactive presentations. It is very powerful and includes a built in scripting language, **Lingo**, that allows creation of complex interactive movies.

6. Multimedia Authoring

-Dreamweaver: a Dreamweaver is a webpage authoring tool that allows users to produce multimedia presentations without learning any HTML.



End of Chapter I

Introduction and Multimedia Data Representations

Kingdom of Saudi Arabia
Ministry of Education
Umm AlQura University
Adam University College
Computer Science Department



المملكة العربية السعودية
وزارة التعليم
جامعة أم القرى
الكلية الجامعية أضم
قسم الحاسب الآلي

This Summary is an Online Content from this Book:
Ze-Nian Li and Mark S Drew, Fundamentals of Multimedia, 1/e, Prentice-Hall, 2004

It is edited for
Multimedia Systems Course 68033 | 6-3
by:

T.Mariah Sami Khayat

Teacher Assistant @ Adam University College

For Contacting:

mskhayat@uqu.edu.sa