IMAGE PROCESSING

Multimedia

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Ch7

Multimedia

What is Multimedia?

Multimedia can have a many definitions these include:

Multimedia means that computer information can be represented through audio, video, and animation in addition to traditional media (i.e., text, graphics/drawings, images).

Multimedia

General Definition

A good general working definition for this module is:

Multimedia is the field concerned with the computer controlled integration of text, graphics, drawings, still and moving images (Video), animation, audio, and any other media where every type of information can be represented, stored, transmitted and processed digitally.

Multimedia

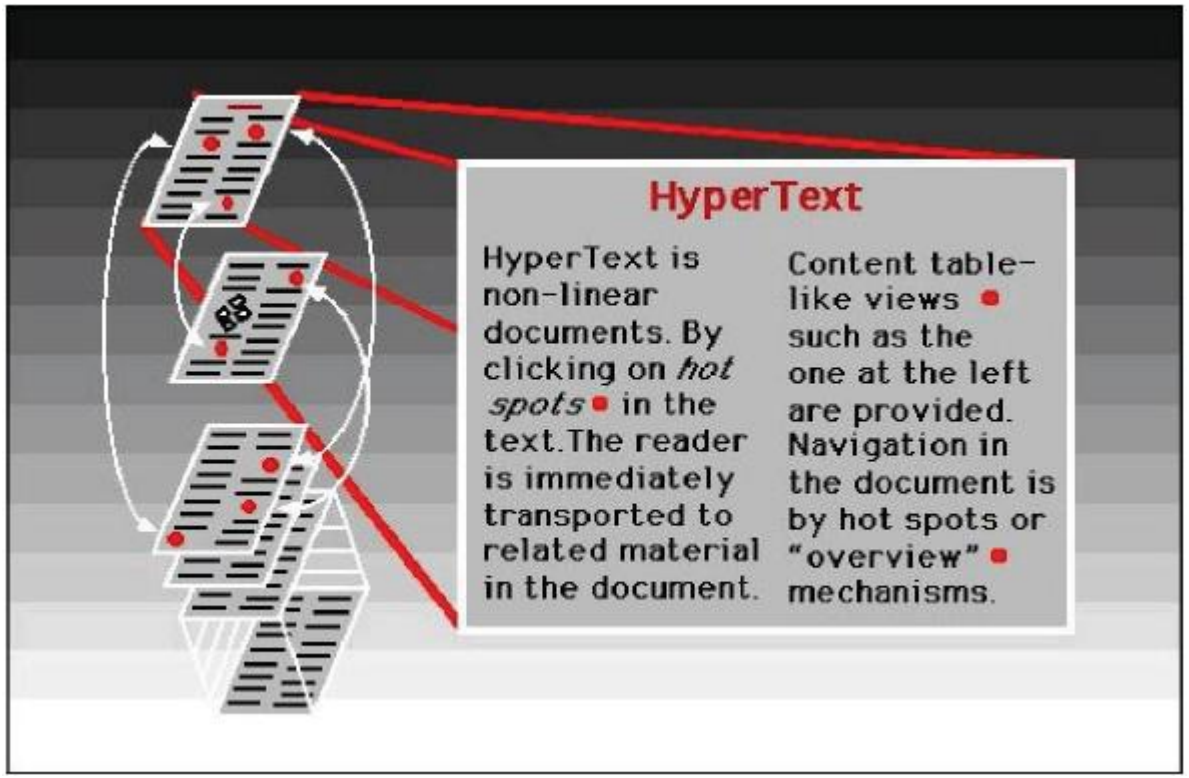
Multimedia Application Definition

A Multimedia Application is an application which uses a collection of multiple media sources e.g. text, graphics, images, sound/audio, animation and/or video.

Multimedia

What is HyperText and HyperMedia?

Hypertext is a text which contains links to other texts. The term was invented by Ted Nelson around 1965.



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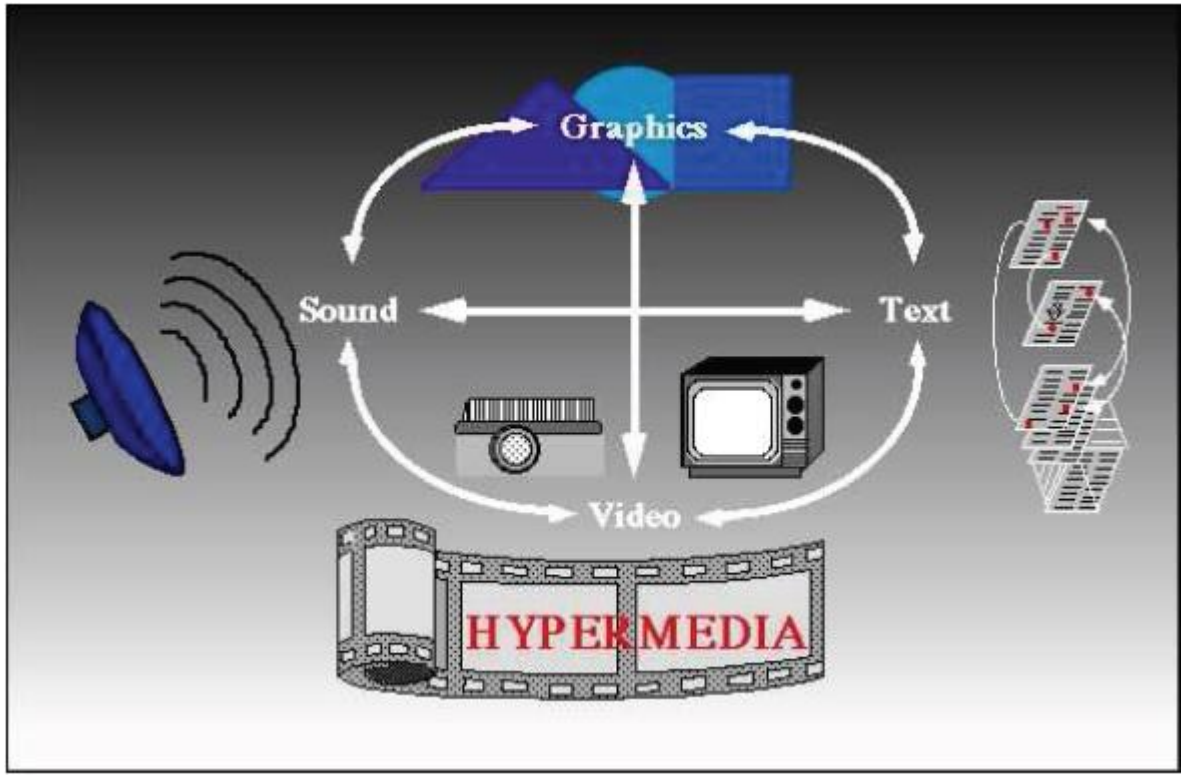
Hypermedia

HyperMedia is not constrained to be text-based. It can include other media, e.g., graphics, images, and especially the continuous media – sound and video.



Multimedia

Example Hypermedia Applications?

- The World Wide Web (WWW) is the best example of a hypermedia application.
- Powerpoint
- Adobe Acrobat
- Many Others?

Multimedia

Multimedia Applications

Examples of Multimedia Applications include:

- World Wide Web
- Multimedia Authoring, e.g. Adobe/Macromedia Director
- Hypermedia courseware
- Video-on-demand
- Interactive TV
- Computer Games
- Virtual reality
- Digital video editing and production systems
- Multimedia Database systems

Multimedia

Multimedia Systems

A Multimedia System is a system capable of processing multimedia data and applications.

A Multimedia System is characterised by the processing, storage, generation, manipulation and rendition of Multimedia information.

Multimedia

Characteristics of a Multimedia System

A Multimedia system has four basic characteristics:

- Multimedia systems must be computer controlled.
- Multimedia systems are integrated.
- The information they handle must be represented digitally.
- The interface to the final presentation of media is usually interactive.

Multimedia

Challenges for Multimedia Systems

- **Distributed Networks**
- **Temporal relationship between data**

– Render different data at same time — continuously.
– Sequencing within the media
playing frames in correct order/time frame in video
– Synchronisation — inter-media scheduling

E.g. Video and Audio — Lip synchronisation is clearly important for humans to watch playback of video and audio and even animation and audio.

Multimedia

Desirable Features for a Multimedia System

Given the above challenges the following feature a desirable (if not a prerequisite) for a Multimedia System:

- Very High Processing Power
- Multimedia Capable File System
- Special Hardware/Software needed
- Data Representations
- Efficient and High I/O
- Special Operating System
- Storage and Memory
- Network Support
- Software Tools

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Components of a Multimedia System

Now let us consider the Components (Hardware and Software) required for a multimedia system:

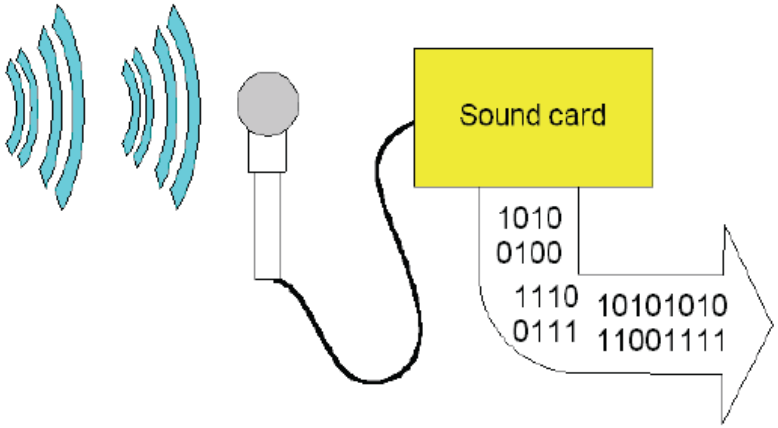
- **Capture devices** — Video Camera, Video Recorder, Audio Microphone, Keyboards, mice, graphics tablets, 3D input devices, tactile sensors, VR devices. Digitising Hardware
- **Storage Devices** — Hard disks, CD-ROMs, DVD-ROM, etc.
- **Communication Networks** — Local Networks, Intranets, Internet, Multimedia or other special high speed networks.
- **Computer Systems** — Multimedia Desktop machines, Workstations, MPEG/VIDEO/DSP Hardware
- **Display Devices** — CD-quality speakers, HDTV,SVGA, Hi-Res monitors, Color printers etc.

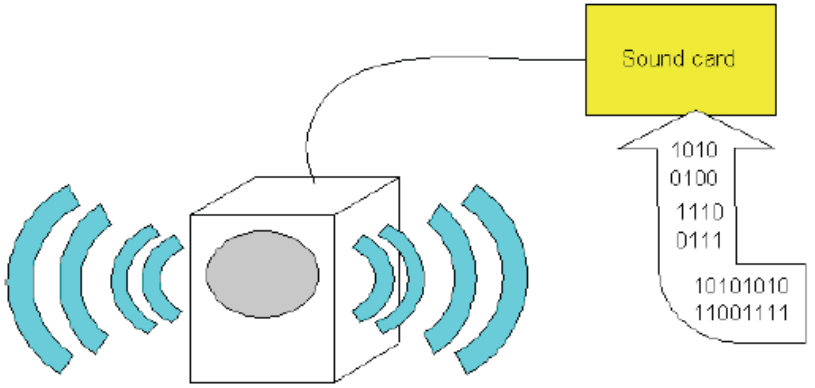
Multimedia

Analog and Digital Signal Conversion

- **Analog**: continuous signals must be converted or digitised for computer processing.

- **Digital**: discrete digital signals that computer can readily deal with.





Take analog signals from analog sensor (e.g. microphone) and digitally sample data

Digital Sampling

Sampling basically involves:

- Measuring the analog signal at regular discrete intervals
- Recording the value at these points