Introduction

Multimedia System

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Silabus

- Introduction to Multimedia

- Digital Acquisition

- Media Representation and Media Format

- Color Theory

- Multimedia Authoring

- Overview of Compression

- Media Compression Images

- Media Compression Video

- Media Compression Audio

- Multimedia Networking

- Wireless Multimedia Networking

- Quality of Service

- Multimedia Database

Value Components

- Presence : 10%

- Homework : 20%

- Middle Test : 30 %

- Final Test : 40%

Definition Of Multimedia

- Multimedia is media and content that uses a combination of different content forms. The term can be used as a noun (a medium with multiple content forms) or as an adjective describing a medium as having multiple content forms.

Historical of Multimedia

1990s, after the success of the digital audio recording industry, and the distribution of digital audio in the form of compac Disc (CD)

The Starter of Multimedia

- Availability of world of low-cost capture devices, rendering devices, and smarter software.

- Larger, less expensive storage device along with research in better compression of media content.

- Technological advance in digital networks and standardization of distribution protocols.

3 process that are now inherent to multimedia system

- Multimedia content creation or multimedia authoring

- Storage and compression

- Distribution

Evolution Perspective

Age	Time and era	Type of information	Storage medium	Mode of distribution
Prehistoric	15,000 BC	Sounds to communicate, gestures, painting	Rock surfaces, cave walls	–
Ancient	500 BC	Alphabets, drawing	Invention of paper	People delivering messages, horseback
Middle Ages	400–1000 AD	Letters, writing	Books	Beginning of a postal system
Renaissance	1300–1800 AD	News, paintings, magazine	Books, libraries	Printing press, steam engines, automobiles
Modern world	1900 AD	Morse code, radio, photographs, movies	Film, magnetic tapes, phonograph	Telegram service, wireless radio waves
Electronic	1950–1980	Telephone, television, fax, computers	Electronic memory, cassette tapes, LP records	Radio and TV broadcasting, satellite communication
Digital	1980 to present day	Computers, digital video, surround sound	Hard disks, CD-ROMs, DVDs	Ethernet, wireless networks, optical networks

Figure 1-1 A brief evolution of information

Multimedia Data And Multimedia System

- Inheret Qualities of Multimedia Data

- Media Types Used Today

- Classification of Multimedia System

Inheret Qualities of Multimedia Data

- Digital : Multimedia information is always digital.

- Voluminous : The size of the data resulting from combining video, audio, and images together is understandably large and voluminous.

- Interactive : Multimedia content can be interacted with from a high-level application point of view.

- Real-time and synchronization

Tujuan

- Memahami definisi dari multimedia dan komputer multimedia

- Memahami fungsi dan manfaat multimedia

- Memahami konsep sistem multimedia dan data stream

- Mengetahui karir-karir yang berkaitan dengan bidang multimedia

Different Media Types Used Today

- Text
- Images
- Video
- Audio
- 2D Graphic
- 3D Graphic

Text

- Text has been commonly used to express information not just today but from the early days. The representation and writing of text information has evolved from simple text to more meaningful and easy-to-read formatted text, using a variety of fonts.

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Image

Images consist of a set of units called pixels organized in the form of a two-dimensional array.

- Bit depth—Bit depth represents the number of bits assigned to each pixel. Accordingly, images are categorized by the bit depth as binary images.

- Formats—Formats are application-specific, for example, faxes are also images that have a format different from digital photographs.

- Dimensionality—Images can be enjoyed singularly or combined in a variety of ways. Stereo images are commonly used for depth-perception effects. Images can also be stitched together to form mosaics and panoramas.

Video

- Video is represented as a sequence of images. Each image in the sequence typically has the same properties of width, height, and pixel depth. Additionally, there is one more temporal parameter known as frames per second or fps.

- Apart from this basic definition, video can be classified depending on the following:

  - Aspect ratio
  - Scanning format

Audio

- Digital audio is characterized by a sampling rate in hertz, which gives the number of samples per second. A sample can be defined as an individual unit of audio information.

- Apart from these properties, audio is also described by:

  - Dimensionality—The dimensions of an audio signal signify the number of channels that are contained in the signal.

  - Frequency Range—Audio signals are also described by the frequency range or frequency band that they contain.

2D Graphic and 3D Graphic

- 2D
  - 2D graphical elements have become commonplace in multimedia presentations to enhance the message to be conveyed. A 2D graphic element is represented by 2D vector coordinates and normally has properties such as a fill color, boundary thick- ness, and so on.
- 3D
  - 3D graphics are primarily used today for high-end content in movies, computer games, and advertising. Like 2D graphics, 3D graphics largely make use of vector coordinate spaces.

Classification of Multimedia System

- Static versus dynamic.

- Real-time versus orchestrated—This is a more common classification.

- Orchestrated refers to cases when there is no real-time requirement.

- Linear versus nonlinear.

- Person-to-machine versus person-to-person.

- Single user, peer-to-peer, peer-to-multipeer, and broadcast.

Multimedia System Today

Multimedia systems can be logically grouped into three parts whose primary functionalities are:

(1) content production,

(2) compression and storage,

(3) distribution to various end users and platforms.
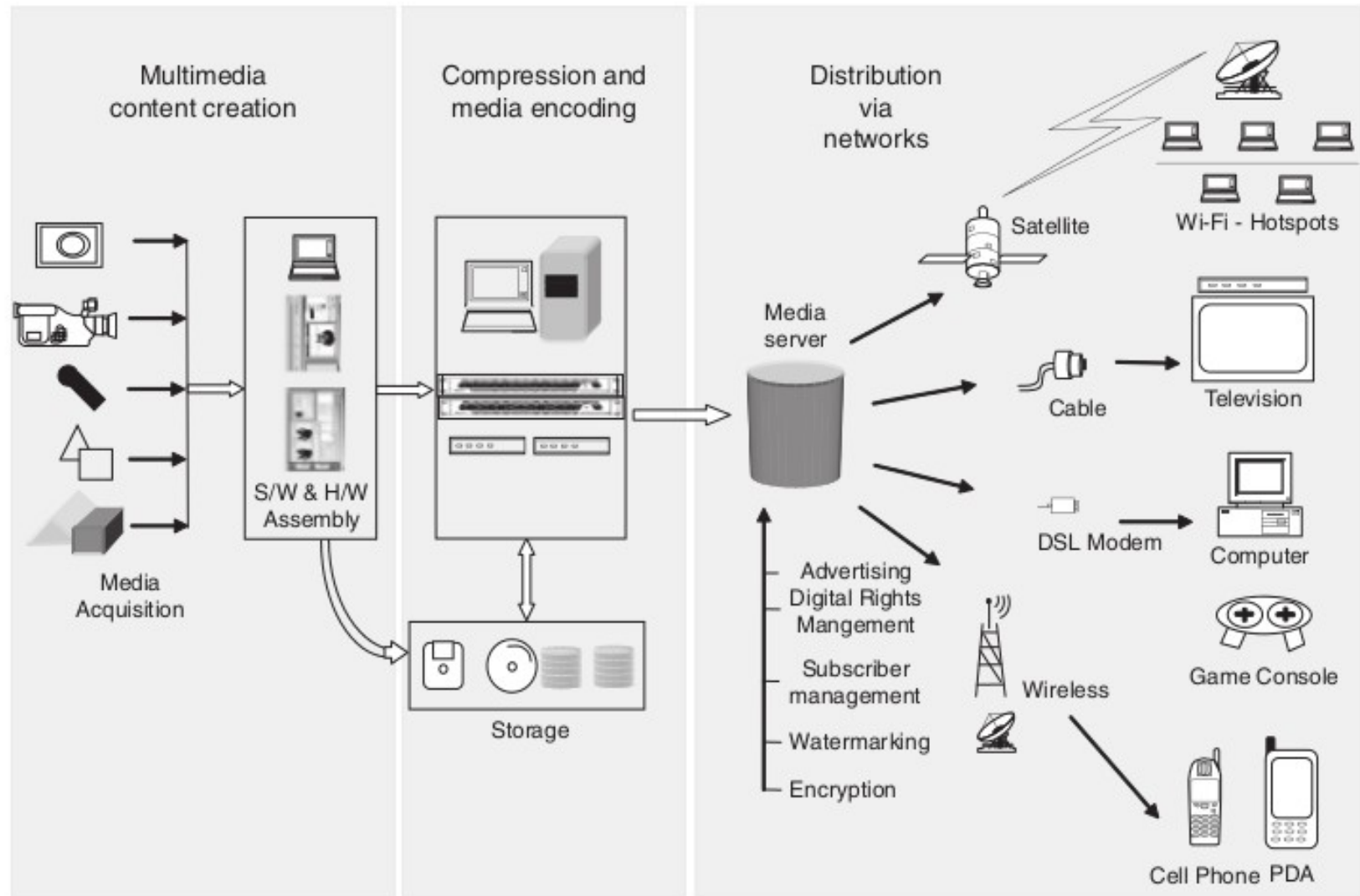
Multimedia System Today

Figure 1-2 Components of a multimedia system today

Multimedia Revolution Couses

- **Digitization of virtually any and every device**—Today, you have digital cameras, camcorders, sound recorders that make good-quality digital media available for processing and exchange. At the same time, digital displays such as high- performance cathode ray tubes (CRTs), liquid crystal displays, plasma screens, and so on allow us to view information at good resolutions.

- **Digitization of libraries of information**—Virtually all libraries, whether general-purpose or specific, are making their way to be digital.

- **Evolution of communication and data networks**—The research in digital networks and networking protocols have made it possible to exchange huge amounts of data over wired, optical, and wireless mediums. Deployments in this area are making availability of bandwidth on demand.

- **New algorithms for compression**—Because multimedia information is very voluminous, abilities to compress information prior to sending it over networks allow us to engineer applications that perform in real time and with a high fidelity.

- **Better hardware performance**—Microprocessors, along with graphical processing units (GPU) are both getting faster and perform better.

- **Smarter user interface paradigms to view/interact with multimedia information on a variety of terminals**—As personal communication devices get compact and smaller in size, the role of user interfaces becomes important when it is expected for them to have information access capabilities similar to a computers.

A Possible Future

- The digital change has already affected people's everyday life and will do so more effectively in different walks of life.

- Although the application areas and communication improvements seem endless, a few common hurdles might need to be solved to make the suggested media and information exchange technologies usable, viable, and commercially practical.

- There will be much-needed applications that can search quickly through this digital myriad of information. Searching and browsing abilities will not be enough.

- With the availability of information also comes the need to have specific, limited, and restricted access to it. This is another area, which will need to play an effective role in the future—digital rights management or DRM

References

- Havaldar, Parag and Medioni, Gerard, Multimedia Systems : Algorithms, Standards, and Industry practices, Course Technology, Canada, 2010.

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