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الوسائط المتعددة

Multimedia (CS451)

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Multimedia (C451)

Syllabus:

1. Introduction to multimedia.
2. Elements of multimedia.
3. Multimedia and hypermedia.
4. Making multimedia .
5. Graphics in multimedia application.
6. Introduction to digital images.
7. Introduction to audio.
8. Introduction to video.
9. Computer animation.
10. Computer and multimedia networks.

Reference:

Ze-Nian Li & Mark S. Drew, "*Fundamentals of Multimedia*", Person Education International, 2004.

Lecture 1:

Introduction to Multimedia

Multimedia means that computer information can be represented through **text, images, graphics, audio, video and animation** in addition to traditional media.

Video can be considered as an **integrated Multimedia** because it contains all the components of multimedia (images, sound and text).

Frame is any number of images in a time period (30 images per second), those images are similar (identical) in characteristics.

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.

- **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.
- **A Multimedia System** is a system capable of processing multimedia data and applications and supports more than a single kind of media
- **A Multimedia System** is characterized by the processing, storage, generation, manipulation and rendition of Multimedia information.

Note : The word **multimedia** is a combination derived from **multiple and media**. The word medium (the singular of media) means a transmission channel. For example, sound is transmitted through the medium of air, or electricity is transmitted through the medium of wires. Similarly, poetry could be considered a medium for transmitting our thoughts

Elements of Multimedia

We have seen that a multimedia system consists of several elements such as sound, graphics, text, and video. We now describe what each one contains.

1) The first element of multimedia we consider is **audio**. The word audio is slightly different from **sound**. Audio consists of the sounds we can hear. This may seem contradictory, but it is well known that humans do not hear all possible sounds. For example, the sound emitted by the dog-whistle is recognized by dogs but not by humans.

Audio is one of the most appealing elements of any successful multimedia presentation. The impact of sound sets the mood and establishes the ambience (بيئه , جو , محيط) of a presentation. It can be used in a number of ways in a multimedia application, for example, to reinforce a message or theme, or to catch the interest and alert the audience. As part of audio content in a multimedia system, we may use music, sound effects, or speech to accomplish the goals of our presentation. The audio that appears in a multimedia presentation is of two types. It is either computer generated, or recorded and converted into a digital format.

2) **Graphic element**. Multimedia presentations are predominantly (في) (الغالب) graphics based. Information communicated through pictures is easier to understand and retain. Graphic elements in a multimedia system could be still pictures (like photographs) converted to digital format with the help of scanners, or generated on the computer. They may be flat (or two-dimensional), such as photographs and paintings, or they may appear solid (or three-dimensional), like sculptures (منحوتات) and objects around us. They may be either static graphic elements or animated. Further, animations may be two-dimensional, as in old cartoon films, or three-dimensional.

3) Computer-generated text is another element of multimedia. A few words appearing in a predominantly graphic multimedia system can have a powerful effect. On the Internet, text is used much more than on stand-alone multimedia products, so it takes on an added importance. Also, text and art can be mixed together in interesting ways to reinforce the message being transmitted. Text can also be animated in interesting ways.

4) Finally, we mention that **video** is another element of multimedia. Obviously, video and audio are closely related, and together they are the most effective means of communication that can be a part of the multimedia system.

Multimedia involves multiple modalities (طرائق) of text, audio, images, drawings, animation, and video. **Examples of how these modalities are put to use:**

1. Video teleconferencing
2. Distributed lectures for higher education (distance learning).
3. Tele-medicine
4. Co-operative work environments
5. “Augmented” reality placing real-appearing computer graphics and video objects into scenes.
6. Including audio cues for where video-conference participants are located.
7. Building searchable features into new video, and enabling very high- to very low-bit-rate use of new, scalable multimedia products.
8. Making multimedia components *editable*

1) Video conferencing

Also called teleconferencing, in which people in different geographical locations can have a meeting- can see and hear one another- using computers

and communications. videoconferencing systems range from videophones (is a telephone with TV-like screen and built-in camera that allows you to see the person you're calling) to group conference rooms with cameras and multimedia equipment to desktop system with small video cameras, microphones, and speakers. Videoconferencing may eliminate the need for some travel for the purpose of meeting and allow people who cannot travel to visit "in person". Many organizations use video conferencing to take the place of face-to-face meetings.

2) Distance learning

Telecommunication technology is enabling many people to learn outside the class room, a process called distance learning. Distance learning can be point-to-point, where students gathered at a specific location and the class is transmitted to them in real time (different place, same time). The students are able to see and hear the professor, and the professor can hear the students off-site and may be able to see them as well. The off-site locations may be around the same campus or across the world.

Distance learning may also be asynchronous (different place, different time). Many courses are offered over the internet in prepackaged form.

3) Telemedicine

The use of medical information exchanged from one site to another via electronic communications for the health and education of the patient or healthcare provider and for the purpose of improving patient care. Telemedicine includes consultative , diagnostic, and treatment services.

Multimedia Research Topics and Projects

To the computer science researcher, multimedia consists of a wide variety of topics:

- 1. Multimedia processing and coding:** multimedia content analysis, content-based multimedia retrieval, multimedia security, audio/image/video processing, compression, etc.
- 2. Multimedia system support and networking:** network protocols, Internet, operating systems, servers and clients, quality of service (QoS), and databases.
- 3. Multimedia tools, end-systems and applications:** hypermedia systems, user interfaces, authoring systems.
- 4. Multi-modal interaction and integration:** “ubiquity” — web-everywhere devices, multimedia education including Computer Supported Collaborative Learning, and design and applications of virtual environments.

Current Multimedia Projects

Many exciting research projects are currently underway. Here are a few of them:

- 1. Camera-based object tracking technology:** tracking of the control objects provides user control of the process.
- 2. 3D motion capture:** used for multiple actor capture so that multiple *real* actors in a *virtual* studio can be used to automatically produce realistic *animated* models with natural movement.
- 3. Multiple views:** allowing photo-realistic (video-quality) synthesis of virtual actors from several cameras or from a single camera under differing lighting.
- 4. 3D capture technology:** allow synthesis of highly realistic facial animation from speech.
- 5. Specific multimedia applications:** aimed at handicapped معاق persons with low vision capability and the elderly
- 6. Digital fashion:** aims to develop smart clothing that can communicate with other such enhanced clothing using wireless communication, so as to artificially enhance human interaction in a social setting.
- 7. Electronic Housecall system:** an initiative for providing interactive health monitoring services to patients in their homes
- 8. Augmented Interaction applications:** used to develop interfaces between real and virtual humans for tasks such as augmented storytelling.

Notes :

- Multimedia is *linear*, when it is not interactive and the users just sit and watch as if it is a movie.
- Multimedia is nonlinear, when the users are given the navigational control and can browse the contents at will.