Multimedia Technology

Introduction to tools and techniques used to create and process multimedia content (hypertxt, voice, audio, graphics, image and video)

Algorithms, standards and protocols for handling of multimedia signals and multimedia information and for the needs of multimedia communications

Multimedia

Image   **Sound**   **Video**   **Hyper/text**   **Graphics**

Natural language processing

Virtual representations

Interactive procedures

Information retrieval

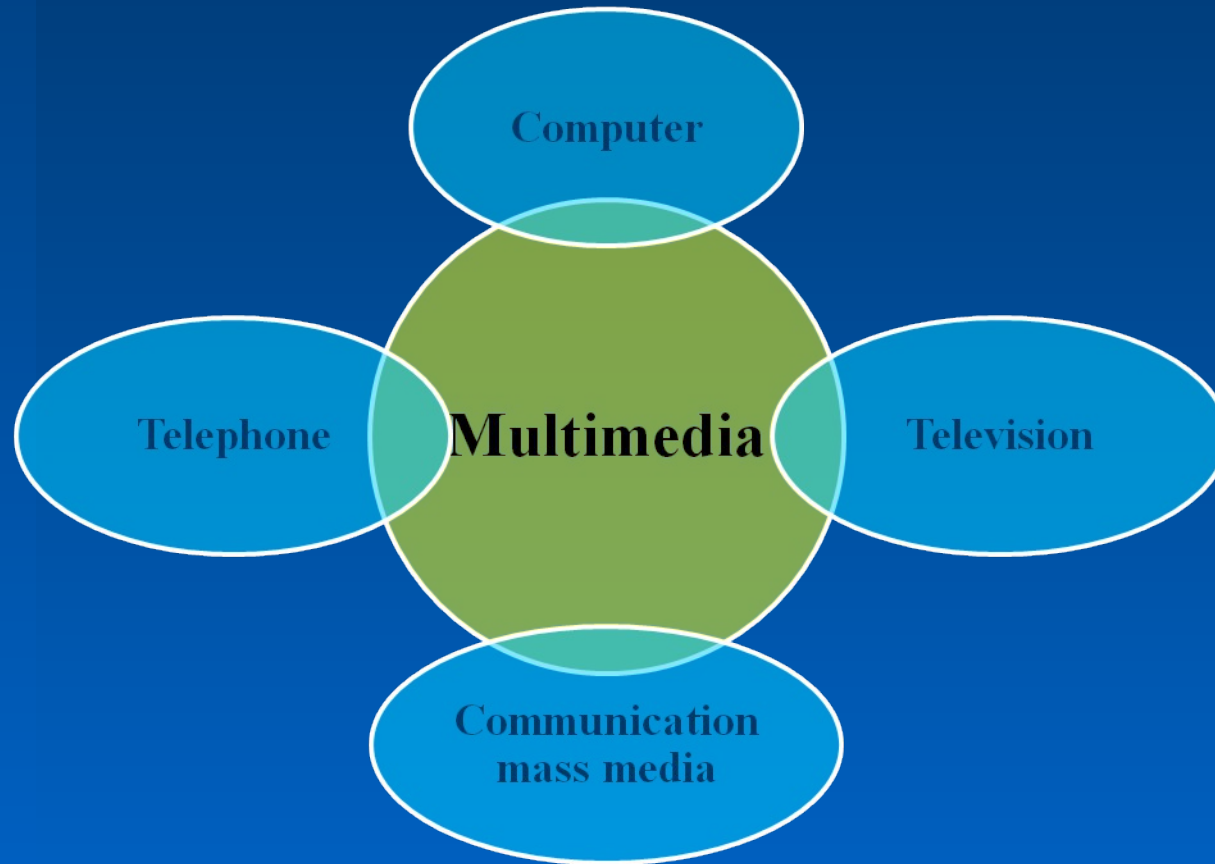**Digital storage media**

Data compression

Network communications

Computing resources

Multimedia: convergence

Multimedia: definition

Medium information presentation form

Capture, storage, processing, transmission and presentation of various modes of information

Text, audio (speech, music), image, graphics, video

Media

Medium	Mode	Time	Source
Text	Visual	Static	Artificial
Image	Visual	Static	Natural
Graphics	Visual	Static	Artificial
Animation	Visual	Continuous	Artificial
Sound	Aural	Continuous	Natural/artificial
Video	Visual	Continuous	Natural

Digital media

Multimedia / «All digital»

Storage and transmission

Content processing and analysis

Virtual environments

Content description

History : hypermedia and multimedia (1/2)

- **Vannevar Bush Memex 1945**

The human mind operates by association. A memex is a device in which an individual stores all his books, records, and communications, and which is mechanized so that it may be consulted with exceeding speed and flexibility.

- **Ted Nelson Xanadu, hypertext 1960**

A File Structure for The Complex, Evolutionary List File

"hypertext" to mean a body of written or pictorial material interconnected in such a complex way that it could not conveniently be presented or represented on paper.

- **Nicholas Negroponte MIT Architecture Machine Group 1967**
- **Douglas Engelbart On-line System 1968**
- **T. Nelson and A. van Dam FRESS 1969**
- **MIT Architecture Machine Group Multiple Media project 1976**
- **Negroponte and Wiesner MIT Media Lab 1985**

History : hypermedia and multimedia (2/2)

Tim Berners-Lee World Wide Web 1989

The goal of the Web was to be a shared information space through which people (and machines) could communicate. The intent was that this space should span from a private information system to a public information. The intent was that this space should span from a private information system to a public information

ISO MPEG 1991

ISO JPEG 1992

University of Illinois NCSA Mosaic 1993

Applications

- **Audiovisual presentations**
- **Navigation in music collections**
- **Photographic album**
- **Audiovisual archives**
- **Museum guides**
- **Distribution of education resources**
- **Virtual representation for education**
- **Telemedicine**
- **Support to persons with invalidities**
- **Videoconference**
- **Collaborative working spaces**
- **Content analysis**
- **Virtual characters**

Themes

Fundamental technologies

    processing, analysis and compression

Systems and networks
    operating system
    protocols
    data bases
    servers

Development tools and applications

Syllabus

- **Hypermedia (HTML)**
- **Digital image**
- **Digital video**
- **Graphics and animation**
- **Digital audio**
- **Multimedia application development**
- **Fundemental methods for signal compression/coding**
- **Audiovisual coding standards (JPEG, MPEG)**
- **Video coding standards (H.264 and H.265)**
- **MPEG-7 for multimedia content description**
- **Content-based multimedia retrieval**
- **Content summarization**
- **Internet and multimedia**
- **Multimedia in mobile networks**
- **Multimedia communications protocols**

Bibliography

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Springer-Verlag, 2004.
R. Steinmetz and K. Nahrstend, Multimedia fundamentals, Prentice Hall, 2002.
R. Packer and K. Jordan, eds, Multimedia : from Wagner to virtual reality,
W. W. Norton, 2001.
J. D. Gibson, T. Berger, T. Lookabaugh, D. Lindbergh and R. Baker,
Digital compression for multimedia: Principles and standards,
Morgan Kauffman, 1998.

Course

Homework
 Bibliographic Reports
 Computer projects

Course web page (in greek):
http://csd.uoc.gr/~hy474

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