

Multimediale Visualisierungssysteme WS 2000/2001

7. Summary

ICSY



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AG: Integrierte
Kommunikationssysteme

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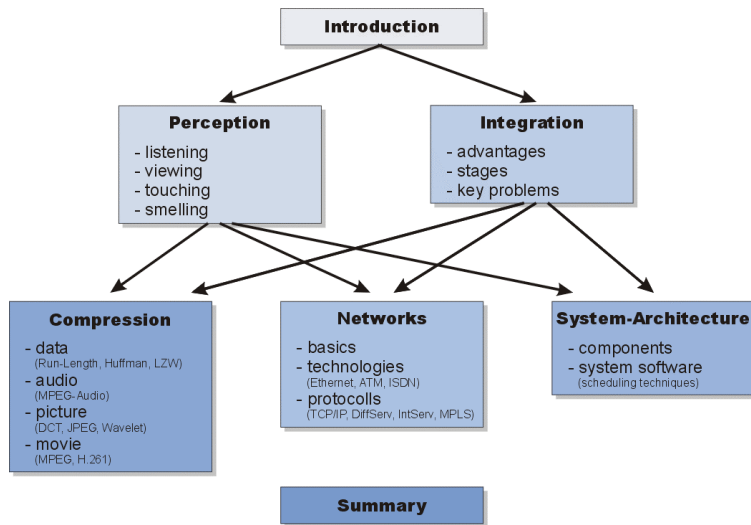
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Site Map



Essential Elements of Multimedia

Essential Elements are:

- Immersion
- Interdisciplinarity
- Hypermedia
- Interactivity
- Narrativity



Properties of a Multimedia System

Flexibility:

- Provide mechanisms to handle all kinds of media, in particular, discrete and continuous media
- A VCR and a desktop publishing system for text and graphics are no multimedia systems.
- An editor with voice annotation is a multimedia system.

Integration:

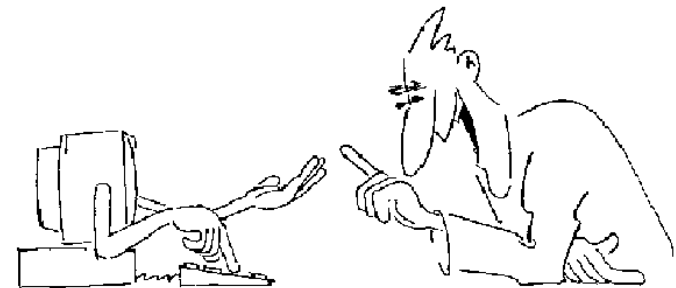
- Independent media storage
- Computer-controlled media combination

Definition:

- *A multimedia system is characterized by the integrated computer-controlled handling of independent discrete and continuous media.*

Another definition of Multimedia

Simulation of human communication



Why multimedia

Why is Multimedia so important now?

- Since WWW everybody is able to use computer networks for communication
- The social development is going toward an "information age"
- Multimedia is enforced by the "National Information Infrastructure (NII)" of Al Gore and similar initiatives

Why is Multimedia possible now?

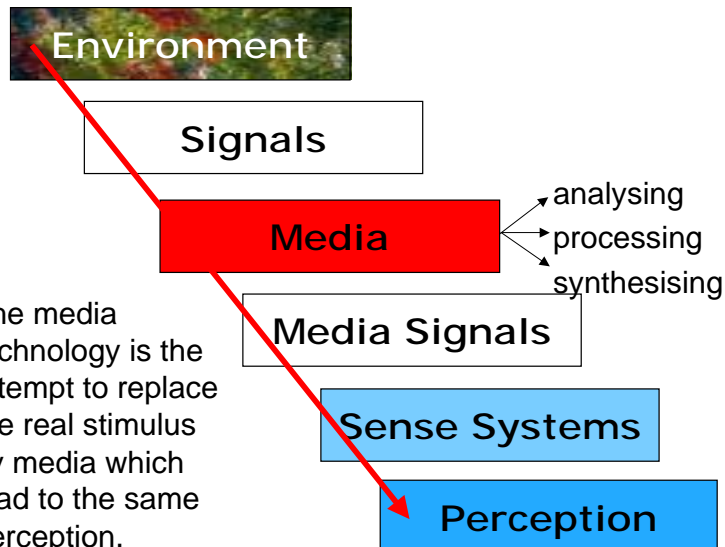
- Different media like text, pictures, audio and video could be digitized
- Input and output devices are digital or have digital controls and interfaces
- A system like a computer that is able to handle digital data is able to integrate different media

Mind and Machine

Multimedia and Sense

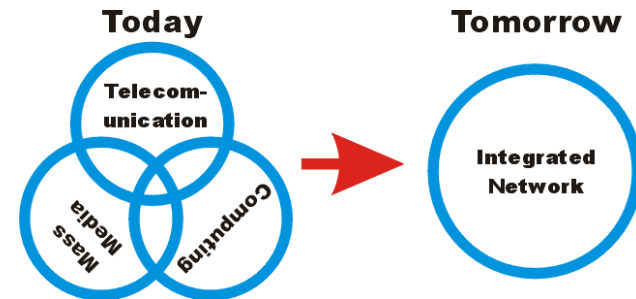
Sense of		Mode of Sense	Display
vision hear smell taste balance	"5 - Sense"	Visual auditory Olfaktorisch Gustatorisch vestibulär	optical acoustic - - -
pressure vibration cold warmth pain	skin touch	taktil	haptic
position power	Proprio- zeptoren	Kinästhetisch	

Environment mediated by media



Integration

Combination of three areas:



Technological outlook:

- Networked computers as the information tools of the 21st century

Networks

One of the most promising aspects of multimedia is communication over (long) distances, therefore the capabilities of the transport technology is important.

Basics:

- Connectivity on Layer 1 – 3
- Circuit switching vs. Packet switching vs. Cell switching

Criteria for usability for multimedia data

- level of performance guarantees
- level of flexibility
- multicast capability
- level of efficiency and costs

Network technologies + protocols

Technologies

- Ethernet + new variants
- Token Ring
- FDDI
- DQDB
- ISDN
- ATM

Protocols

- TCP/IP suite + IPv6
- QoS in data networks
 - DiffServ
 - Intserv / RTP
 - MPLS
- RTP

Compression

Raw digitized data is much too large and contains more information than necessary. Compression techniques are used to reduce the data size.

- Entropy coding: loss less compression techniques, take into account the statistical occurrence of symbols within a stream:
 - Run-Length, Lempel-Ziv, Huffman, Arithmetic coding
- Source coding: (often) lossy compression techniques, that take into account specific data characteristics and the human sensitiveness to that type of data:
 - Discrete Cosine Transform
 - Wavelet + Fractal
 - Also image preparation: YUV
- Hybrid coding: combination of source coding and entropy coding:
 - JPEG
 - MPEG-1 / 2 / 4, H.261, H.263
 - MPEG-Audio

System-Architecture

The hardware architecture and the system software of endsystems (desktop computers) are not adapted for handling continuous media:

- Hardware support for handling continuous media will increase its quality. Especially the replacement of a single asynchronous bus is required.
- System software must be adapted to take into account some real-time aspects of data processing.
- Avoid handling of continuous media by applications directly

The End