

# Multimediale Visualisierungssysteme WS 2000/2001

## 7. Summary

ICSY



Prof. Dr. Paul Müller

AG: Integrierte  
Kommunikationssysteme

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## How to contact

Prof. Dr. Paul Müller  
34 / 312  
Tel.: 0631 / 205 - 2263  
e-mail: mueller@uni-kl.de

Bernd Reuther  
32 / 344  
Tel.: 0631 / 205 - 2161  
e-mail: reuther@informatik.uni-kl.de

Ye Yuan  
32 / 346  
Tel.: 0631 / 205 - 4173  
e-mail: yuan@informatik.uni-kl.de

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Dipl. Inform. Bernd Reuther  
Dipl. Inform. Ye Yuan

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## Literatur

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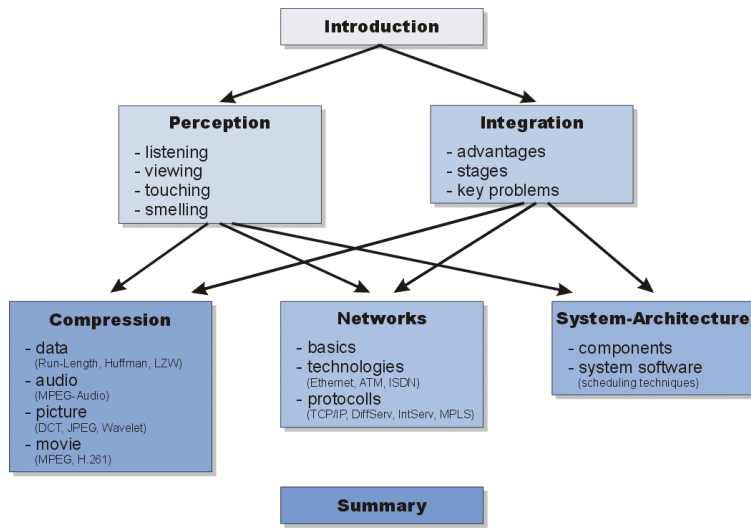
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## Site Map



## 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:

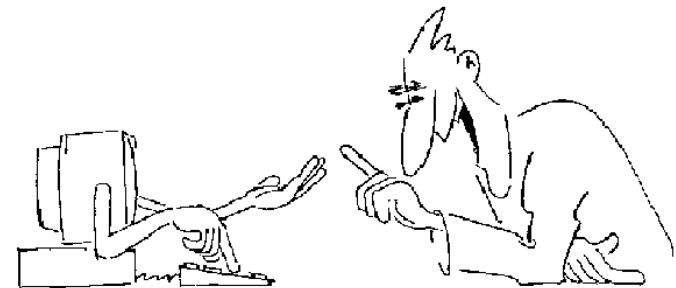
- Independent media storage
- Computer-controlled media combination

### 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?

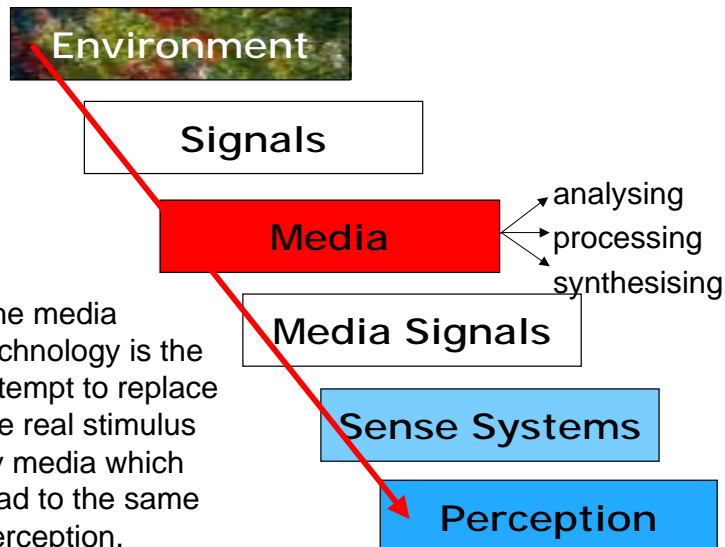
- Different media like text, pictures, audio and video could be digitized
- Input and output devices are digital or have digital controls and interfaces
- A system like a computer that is able to handle digital data is able to integrate different media

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	

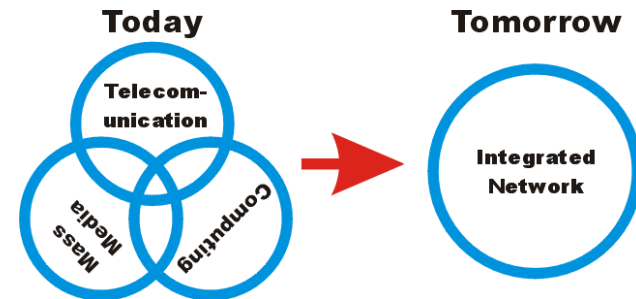
## Environment mediated by media



The media technology is the attempt to replace the real stimulus by media which lead to the same perception.

## 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