



NSCET E-LEARNING PRESENTATION

LISTEN ... LEARN... LEAD...





ELECTRONICS & COMMUNICATION ENGINEERING



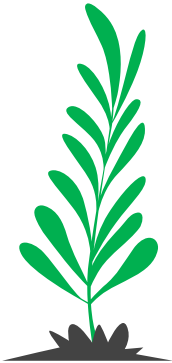
IV YEAR / VIII th SEMESTER

EC 6018 – MULTIMEDIA COMPRESSION & COMMUNICATION

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UNIT-5

MULTIMEDIA NETWORKING



Information Perception from External World

- Scene: 60%
- Sound: 20%
- Touch(feel): 15%
- Taste: 3%
- Smell: 2%

Media: means of transport information(digital data)

- text, audio, image, graphic, video

Multimedia

- combination of two or more media

Persistent vs Non-persistent(live) information

Multimedia System

- a computer system that can accept multimedia information from the external world
- Multimedia Applications
- Local Multimedia Application
- Distributed Multimedia Application
- Multimedia Communications
- concerns the technology required to manipulate, transmit, and control multimedia across a networked communication channel

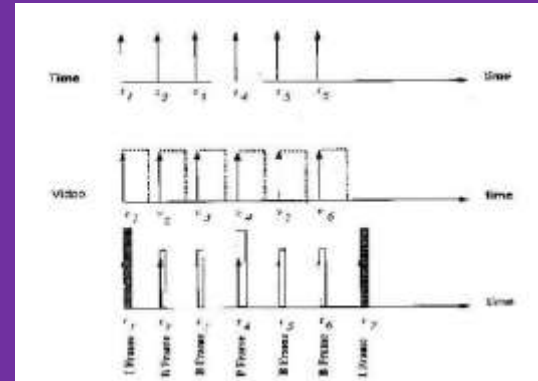
Continuous and Discrete Media

Discrete media

- ❑ time independent media
- ❑ e.g. : text/data, image, graphics

Continuous(temporal) media

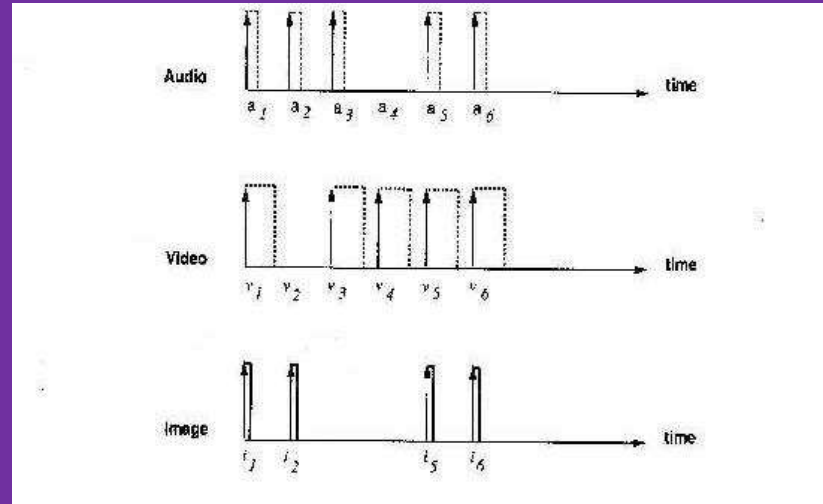
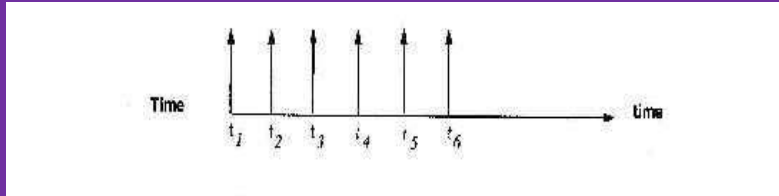
- ❑ time-dependent media (real time media)
- ❑ requires continuous playout as time passes
- ❑ e.g : audio, video



Media Synchronization

intra-media synchronization: e.g. audio

□ inter-media synchronization: e.g. movie



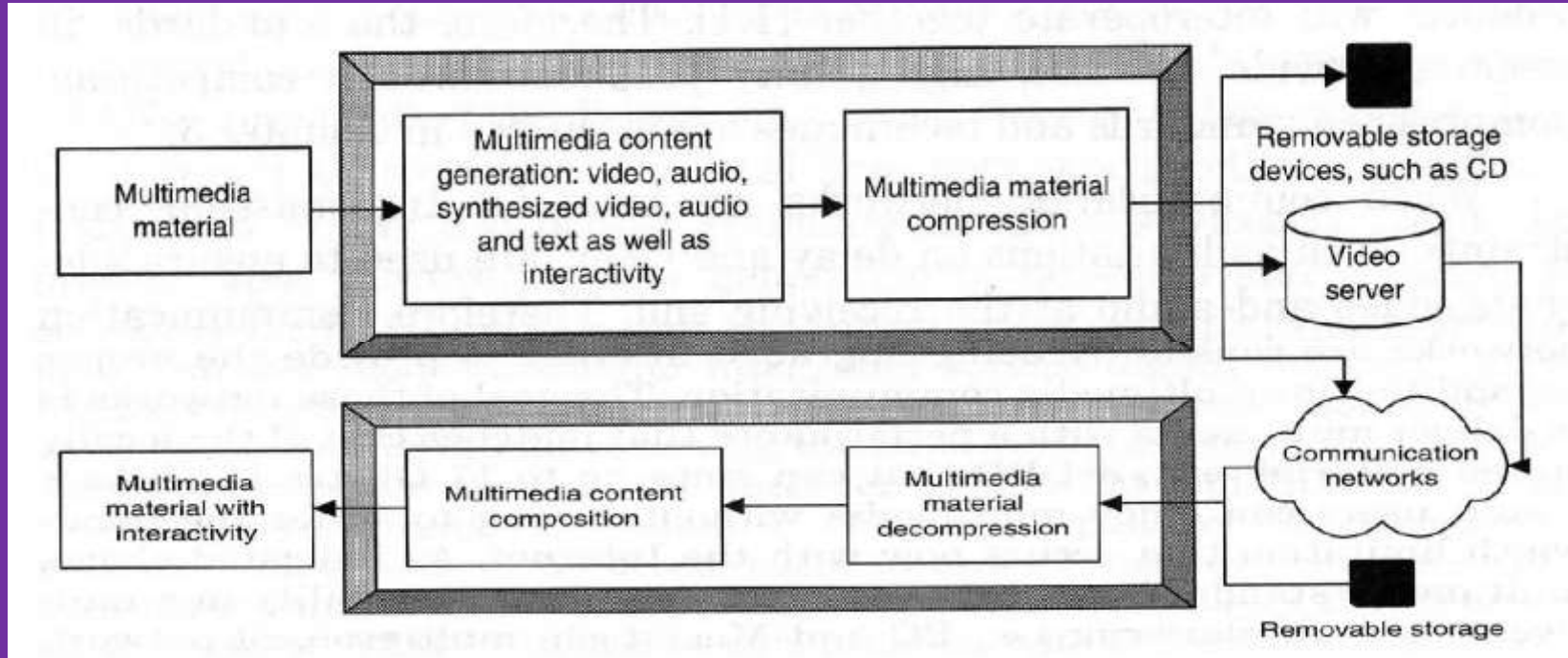
Analog reality, digital approximations.

- Conversion from A-to-D, and D-to-A
- Sampling, Quantization + Encoding Process
- Advantages of digital:
 - Cost
 - Reliability
 - High-speed (electronic) storage
 - Programmability

Multimedia Computer and Software

- Multimedia PC
- Multimedia system software
 - ❑ Microsoft
 - ❑ Video for Windows
 - ❑ ActiveMovie
 - ❑ DirectShow
 - ❑ Apple's QuickTime
 - ❑ Java Media Framework (JMF)

Multimedia Generation & Delivery



Multimedia Communications

Distributed multimedia applications require multimedia networks

- ❑ Characteristics of Multimedia Networks
 - Broad Bandwidth
 - Multicasting
 - Real-time Constraints
 - Reliability
 - QoS
- ❑ Multimedia over IP
 - Mbone: Multicast Backbone
 - Protocols: RSVP, RTP, ST2
 - Applications
 - ◆ Cu-SeeMe
 - ① ◆ Internet Talk Radio
 - ① ➤ Other audio-visual tools: vat, nv, ivs, ...

Multimedia in Networks

- Streaming stored MM
 - Clients request audio/video files from servers and pipeline reception over the network and display
 - Interactive: user can control operations (similar to VCR)
 - Delay: from client request until display start can be 1 to 10 seconds
- ❑ Unidirectional Real-time
 - Similar to existing TV and radio stations, but delivery over the Internet
 - Non-interactive, just listen/vis
- ❑ Interactive Real-time

MM Traffic Source Characteristics

- Throughput Variation with time
 - Constant Bit Rate (CBR)
 - ◆ Fixed Bandwidth
 - ◆ Intended for real-time applications
 - Variable Bit Rate (VBR)
 - ◆ Transmit rate varies with time (bursty)
 - ◆ Intended for Voice/Video
 - Unspecified Bit Rate (UBR)
 - ◆ Intended for non-critical applications
 - ❑ Time Dependency
 - ❑ Bidirectional Symmetry
 - Symmetric or Asymmetric

- Throughput Requirement
 - ☐ High bandwidth requirement
 - ☐ High storage bandwidth requirement
 - ☐ Streaming requirement
- Reliability(error control) Requirement
 - ☐ Error control ☐ End-to-end delay
 - ☐ Tolerance of transmission network errors
 - ☐ audio, video: tolerable due to human perception
 - ☐ audio is more sensitive than video
 - ☐ text: usually not tolerable
 - ☐ Delay is more important than error in continuous media

Delay Requirement

☐ Multimedia connection may consist of multiple streams

Type of connection

☐ Asynchronous : no upper limit on the delay

☐ Synchronous : two streams transmit at the same rate and arrive at the same time

☐ Isochronous : small bounded delay

☐ Delay variation is important

Quality of Service Requirement

- How Much Bandwidth is Enough?
- How Much Delay is Acceptable?
 - interactive applications: 100-300 ms (one-way)
 - non-interactive playback: seconds or minutes
- How Much Jitter is Acceptable?
 - buffer space and delay limitations
- What Error or Loss Rate is Acceptable?
 - bit Errors, packet errors, and frame errors
 - effect of compression
- QoS requirement can be expressed in QoS parameters

QoS Parameters

- ❑ Traffic throughput(bandwidth)
- ❑ Delay
- ❑ Jitter
- ❑ Transmission reliability
- ❑ Synchronization

QoS Provision

Traffic shaping

- Resource reservation and scheduling
- Resource negotiation
- Admission control
- Policing

QoS Guarantees

- ❑ Traffic "Burstiness" or Variability
 - peak rate, average rate, maximum burst size
- ❑ Deterministic (100%) Guarantees
 - based on peak traffic rate
 - simple, predictable, conservative
- ❑ Statistical (< 100%) Guarantees
 - based on peak and mean traffic rates
 - complex, less predictable, higher utilization
- ❑ No Guarantees
 - "best effort" service

Applications of MM Communications

Entertainment

- VoD
- Interactive games
- Interactive program guide
- Home shopping

Education

- Cyber university
- Distance learning

- ❑ Industrial/business
 - CAD/CAE
 - Video conferencing
 - Multimedia banking
- ❑ Medicine
 - Telemedicine
 - Remote diagnosis

Thank You

