Multimedia Systems

Introduction

Mahdi Amiri

February 2011
Sharif University of Technology
Multimedia System

Previous session

- Review course website resources
- Announcements
- Password
- Handling large files

Multimedia Systems
CE Department - Sharif University of Technology
Spring - Group 3

Main Menu:
- Home
- Syllabus
- Assignments
- Grades
- Calendar
- Discussion Area
- Links
- Resources

Announcements

- 1389-11-16 February 05, 2012 07:05 PM
  New resources are uploaded. Check out “Resources” section in this website.

- 1389-11-11 January 31, 2011 07:52 AM
  “This world is just too wonderful to be described by words, that’s why there is Multimedia…”
  Happy new semester everyone! Welcome to the Multimedia Systems course.
  The first day of class is Tuesday 1389/11/12.
  Regards,
  H. Arani

Instructor:
Mahdi Amiri
(m_amiri@ce.sharif.edu)

3 Units
Sun. and Tue., 15:00-16:30
Room: 826

This website is visited 208 times since January 2011.
updated Saturday 2011-02-05 19:05

This website is generated automatically by CE-Community Generator which is produced by
Yasser Farg Jaffer and is under GNU GPL version 2.0.
Multimedia System

Media

- Text
  - sms address to me.

- Drawing
  - Let me see the bar chart for this data table.

- Audio
  - Can’t chat, I have to call you.

- Still image
  - See to believe.

- Video
  - Wonder how it works.
Multimedia System

Media

- **Ascii art**
  - Early printers often lacked graphics ability.
- **Ultrasonography**
  - Visualizing subcutaneous body structures.
- **Spectrogram**
  - Audio signal analysis.
Multimedia System

Media

- Computer controlled integration of different media
  - Text
  - Audio
  - Graphic
  - Drawing
  - Still image
  - Video
  - Animation
  - Every other type of data representation forms
Multimedia System

Where multimedia used to be … digitally.

- Represented
- Stored
- Transmitted
- Processed
Multimedia Systems

HyperMedia

- HyperText
  - A text which contains links to other texts
  - Ted Nelson, 1965
  - Non-linear traversal

- HyperMedia
  - Can include other media too
Multimedia Systems

HyperMedia Examples

- WWW
- PowerPoint
- Adobe Acrobat
- iSilo
  - Text compression, Hyperlinks, Images, Tables, Formatted text

Tim Berners-Lee
first proposal for www: 1989
Multimedia Systems

HyperMedia: True generalization!

- **HTML**
  - No version management, no rights management.

- **Xanadu**
  - A word processor capable of storing multiple versions, and displaying the differences between these versions

- **ZigZag**
  - Data Model, Database and visualization system
Multimedia Systems

Characteristics

- Computer controlled
- Integrated
  - Seamless
- Data are represented digitally
- Interactive interface
  - End-user is able to control the elements of media
  - Non-linear
Multimedia Systems

Challenges

- Digital representation
  - Analog to digital conversion, sampling

- Large data requirements
  - Storage, compression

- Distributed networks
  - Bandwidth, QoS

- Maintaining temporal relationship between data
  - Sequencing (playing frames in correct order/time frame in video)
  - Synchronization (inter-media scheduling, e.g. Lip synchronization)
Multimedia Systems

Desirable Features

- **Hardware**
  - Very high processing power
  - Efficient and high I/O
  - Large storage and memory units
  - Network support
- **Software**
  - Multimedia capable file system
  - Special operating system
  - User friendly software tools: Easy to use, Easy to understand
  - Network support
Multimedia Systems

Components

- **Capture device**
  - Video camera, Audio microphone, Keyboard, Mouse, Tablet, OCR, different sensors

- **Storage device**
  - Hard-disk, CD-ROMs, DVD-ROM

- **Communication Network**
  - LAN, Intranets, Internet

- **Computer System**
  - Multimedia desktop machine

- **Display Device**
  - Speaker, Monitor, Printer
Multimedia Systems

Applications

- World Wide Web
- Video conferencing
- Interactive TV, Video-on-demand
- E-learning, Hypermedia courseware
- Home shopping
- Games, Virtual reality
- Digital video editing and production systems
- Collaborative software, Groupware
- Edutainment, Infotainment
Multimedia Systems

Multimedia Data

- **Format**
  - Raw text, Rich text format
  - Bitmap graphics (Image raster), Vector graphics
  - Time independent (text), Time dependent (video)

- **Size**
  - Typ. PAL digital video: 720 by 576 pixels for each one of 3 color components, 25 frames per sec. ➔ ~ 30 MB per sec., ~ 104GB per hour

- **Standards**
  - JPEG
  - MPEG-2, MPEG-4
Multimedia Systems

Graphics Example

Red 80%  Red 36%  Red 93%
Green 80%  Green 36%  Green 91%
Blue 77%  Blue 13%  Blue 0%

7x Magnification
Vector

Bitmap
Thank You

Next Session: Review of Signals and Systems

FIND OUT MORE AT...

1. http://ce.sharif.edu/~m_amiri/