Introduction to Multimedia Computing

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Learning Outputs of Lecture 11

- Video segmentation
  - Transitions of the shots
  - Camera of the shots
- Video segmentation under uncompressed domain
- Video segmentation under compression domain
- Related applications
Subject Learning Outputs

- Basic knowledge for multimedia computing
  - Hypertext representation
  - Text compression
  - Image data representation and compression
  - Video data representation and compression
  - Audio data representation and compression
  - Image content analysis and image data retrieval
  - Video data analysis and video segmentation

- Basic programming skill for multimedia data
  - Video compression and decompression using Matlab
Hypertext Representation and Text Compression

- Introduction to html
  - What is html
  - Html document with web generation
- Data compression
  - Compression ratio
- Lossless compression and lossy compression
  - Entropy defines the boundary of lossless compression
- Lossless compression
  - Run-length coding
  - Dictionary-based coding
  - Entropy coding
- Lossy compression
  - Quantization
  - Transform coding
Image Data Representation and Compression

- Fundamentals of image data representation
  - Standard image
- Gray-level image
  - Bitmap and bitplane
- Color image
  - Light and human vision
  - Different color models
  - 24-bit color image and 8-bit color image
  - Histogram and color lookup tables
- Some popular image file formats
- Image data compression
  - JPEG
Video Data Representation and Compression

- Video data representation
- Video data compression
- MPEG family
- MPEG-1 video coding
  - Motion compensation
  - I-frame
  - P-frame
  - B-frame
Audio Data Representation and Compression

- Basics of Sound
- Basics of Audio
- Basics of speech
- Digitize the sound
  - Sampling
  - Quantization
- Audio compression
  - MP3
- Basic elements of music
Image Content Analysis and Image Data Retrieval

- Basic concept of image retrieval
  - Text-based image retrieval
  - Visual-based image retrieval
- Content-based image retrieval
  - Image content description
  - Image segmentation
  - Image retrieval methods
- Performance evaluation
Video Data Analysis and Video Segmentation

- Basic concept of video segmentation
  - Shot and scene
  - Object, event, genre
- Shot segmentation
  - Unbroken sequence of frames recorded from a single camera
  - Transition of the shots
    - Abrupt transition
    - Gradual transition
  - Camera operations
  - Segmentation in uncompressed domain
  - Segmentation in compressed domain
Final Examination

- **General information**
  - Time: Dec. 14 19:00 – 21:00
  - Venue: P306
  - Close book
  - Calculator is allowed

- **Form of the questions**
  - True or False: 20%
  - Calculate or answer the question: 80%

- **How to prepare the final exam**
  - Only covers lecture notes
  - The form and the difficulty is similar with quizzes

- **Special office hour**
  - Dec. 14 14:30 – 16:30 Sat.
  - Dec. 12 14:30 -16:30 Thur.