CS 3570  多媒體技術概論
Introduction to Multimedia

• Class Meeting:  T5F5F6  資電館 234
• Instructor:  賴尚宏, 資電館 639,
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• Office Hours:  T2, F7 or by appointment
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Course Objective

• This course will introduce fundamental techniques for digital image/audio/video representation, compression, and processing.

• Students will learn the knowledge of the multimedia signal processing techniques, and practical implementations of various multimedia applications.
Course Contents

• Digital Data Representation and Communication
• Digital Image Representation
• Digital Image Processing
• Digital Audio Representation
• Digital Audio Processing
• Digital Video Representation and Communication
• Digital Video Processing
• Multimedia Authoring
Image Enhancement Example

Adjusting the image histogram to improve image contrast
Image Denoising Example

FIGURE 3.37 (a) X-ray image of circuit board corrupted by salt-and-pepper noise. (b) Noise reduction with a $3 \times 3$ averaging mask. (c) Noise reduction with a $3 \times 3$ median filter. (Original image courtesy of Mr. Joseph E. Pascente, Lixi, Inc.)

Application of the median filter
Audio Signal Processing
Textbook

Required:

Prerequisites

- Linear Algebra
- Probability
- Basic programming skills
Grading

Midterm Exam. (May 6)  30%
Homeworks (5)          40%
Final Project          20%
Class Participation    10%
Homework Policy

• Homeworks will involve programming assignments (in Matlab, C, or C++).

• Discussion of homework is encouraged, but you have to write your own. No copying is strictly enforced.

• Homework should be delivered before the announced due time. The score of late homework will be reduced by 20% per day.
Final Project

• You are required to do a final project of a topic from a list of suggested topics.
• You can form a group to do the final project. A group can consist of one, two, or three students.
Course Webpage

• http://cv.cs.nthu.edu.tw/courses.php

• It will contain the course slides and basic course information.

• Important course announcement will also be posted on this webpage.
Class Participation

• Class attendance is required and treated as the basic requirement for class participation.
• Asking questions is strongly encouraged.
• There will be simple quizzes in class randomly held during the semester.
CS 4520 Classroom Rule

• No eating is permitted.
• No sleeping during the class.
• Disturbance to others in class should be minimized.
• Cell phone should be turned off during the class.
Image Restoration

Motion Deblurring, Image Stabilization
Motion Deblurring
Structure-Preversing Image/Video Retargeting
Facial Animation: Caricature Generation

- Feature exaggeration
  - Personal shape characteristics (C)
  - Personal texture characteristics (T)
  - Expressional style (E)

Input Images

C+T+E
Vision-Based User Interaction

- Real-time 3D motion capture of human gestures and body motion from 3D cameras
- Current video-based motion capture systems either need markers placed on human body or only work under very restricted conditions
- Control games with your own body motion/gesture and create immersive experiences by combining 3D personal image into the game scene
3D Video

• 3D cinema
  – Stereoscopic 3D, glasses-based
  – Increasing number of 3D movie production
• 3D TV - home entertainment
  – Stereoscopic
  – Autostereoscopic: multiple views
  – Various input formats and display sizes
  – Glasses may not be acceptable in the near future
• 3D mobile
  – Autostereoscopic two-view display with fixed viewing position
  – On the market

3D content creation will be the key to the emerging 3D market.