SYDE 575: Introduction to Image Processing

Alexander Wong
Vision and Image Processing Group
Department of Systems Design Engineering

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About SYDE 575

- Introductory course to the principles of image processing
- Topics Covered
  - Psychovisual model of the human vision system
  - Image enhancement in the spatial domain
  - Image enhancement in the frequency domain
  - Image restoration
  - Color image processing
  - Image and video compression
  - Image representation
  - Special topics in image processing (e.g., segmentation, registration, wavelets)
Course Grading

- Homework problems
  - Assigned but not graded
- Labs (15%)
  - 3 computer labs, done in Matlab
- Midterm (20%)
- Term Project (15%)
  - Done individually
  - Evaluate or compare existing algorithms, or design new algorithm
  - Range of topics very broad
- Final (50%)
Reading

- Required textbook
- Course slides available on the web
  http://www.einfodaily.com/piTunez/syde575.htm
What's Image Processing?
Image Processing Operations

- **Enhancement and Restoration**
  - Improve sharpness
  - Adjust image size
  - Remove scratches
  - Correct warping

- **Storage**
  - Efficiently store images and videos on multimedia devices

- **Extract Information**
  - Extract text from document
  - Measure tumor size from a radiograph
Applications

- Enhance image detail
Applications

- Noise reduction and sharpening
Applications

- Inpainting

Source: Criminisi et al. 2004
Applications

- Pseudocoloring for Security Screening

Source: Gonzalez and Woods
Applications

- Image Compression

1:1  
14:1
Applications

- Content-based Image Retrieval

Source: Li et al. 2008
Applications

- Panorama Generation

Source: Szeliski et al. 1997
Applications

- Spine Segmentation from Radiograph