

TEL 519E – Image Processing

Fall 2010

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Class Meets : 13.30 – 16.30, Thursday
EEB Mustafa Santur Seminar Odası

Textbook : R. C. Gonzalez and R. E. Woods, 'Digital Image Processing', 3rd edition, Pearson.

Supplementary : J. S. Lim, 'Two-Dimensional Signal and Image Processing', Prentice Hall.

Webpage : <http://web.itu.edu.tr/ibayram/Courses/TEL519E/>

Tentative Course Outline

(1) Introduction

(2) Point Operations

- Gamma Correction
- Contrast Stretching
- Histogram Based Operations
- Spatial Filtering

(3) Multidimensional Signal Processing

- 2D Continuous Fourier Transform
- Sampling, Aliasing
- 2D DFT, DCT
- Laplacian Pyramid
- 2D Separable Haar Transform

(4) Filter Design

- Zero Phase Filters
- Frequency Transformation Method
- Fan Filters

(5) Image Segmentation

- Edge Detection
- Thresholding
- Segmentation

(6) Image Restoration

- LTI restoration
- Denoising
- Wiener Filter
- Restoration as an Inverse Problem
- Projections onto Convex Sets

(7) Introduction to Computed Tomography

- Radon Transform, Fourier-Slice Theorem
- Reconstruction From Projections (Filtered Back Projection, ART)