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OFFICE HRS.: Monday - Thursday 11:20-12:20 PM
Monday, Wednesday Briefly before or after EE5372 class
Friday (unless other meetings) 11-12 noon (send e-mail or call before to confirm)

CLASS TIME/PLACE (tentative): Monday and Wednesday 7:30 – 8:50 P. M. in CRBL 201

TEXTBOOKS:
Textbook URL: http://www.imageprocessingplace.com/DIP-3E/dip3e_main_page.htm
Textbook URL: http://www.imageprocessingplace.com/DIPUM-2E/dipum2e_main_page.htm
(4) Reference:

PREREQUISITE: The following courses or their equivalents: (1) EE3353 (Discrete-Time Signals and Systems) and (2) EE 3384 (Probabilistic Methods). Useful additional background would be one or more of these:
(3) Digital Signal Processing (DSP) such as EE4383 or EE5371
(4) Biomedical Imaging or Biomedical Signal and Image Processing such as EE5353
(5) Computer Vision such as EE5360
(6) Permission of the instructor (strong mathematical background, etc.)

COMPUTER USAGE: Homeworks and computer assignments will require the use of MATLAB with the Image Processing Toolbox and possibly the Simulink Video and Image Processing Blockset and/or the Computer Vision System Toolbox (new). Having access or experience with other image processing or computer vision software packages such as CVIPTools, ImageJ, LabView, OpenCV, etc. is very beneficial and could be used to supplement Matlab, let me know. Finally, the DIPUM Toolbox 2 (m-files or Matlab P-Code?) toolbox that comes with Reference #2 above is available through me if you want to test or supplement your work with some of the functions. Let me know.

COURSE APPROACH: The course will follow closely the theme presented by the Main Textbook. You must have a copy of the textbook for in-class open-book Exams. Depending on student interest, a project may replace Exam 3, see below. Undergraduates taking this course as EE4371 (Engineering Problems Seminar) will be allowed to skip the Project or Exam 3.
GRADING: Two in-class semester exams: 50 %
Homeworks and computer assignments 30 %
Final Project or Exam 3 20 %
TOTAL 100 %

PROPOSED TOPICS FROM THE MAIN TEXTBOOK, VERSION 1.0

I- DIGITAL IMAGE FUNDAMENTALS (parts of Chapter 2, possible supplement on camera imaging): visual perception, image sampling and quantization, pixel relationships, camera imaging system, etc.

II- INTENSITY TRANSFORMATION AND SPATIAL FILTERING (parts of Chapter 3): gamma correction, histogram equalization and matching, spatial convolution, filter masks, image sharpening, etc.

III- FILTERING IN THE FREQUENCY DOMAIN (parts of Chapter 4): Fourier transform of 2-D signals and sampling, the DFT in 1-D and 2-D and properties, image smoothing and sharpening in the frequency domain,

IV- IMAGE RESTORATION AND RECONSTRUCTION (parts of Chapter 5): mean and order statistics filters, image degradation estimation, Wiener filtering, etc.

V- COLOR IMAGE PROCESSING (parts of Chapter 6): Color models, color transformations, color corrections, etc.

VI- MORPHOLOGICAL IMAGE PROCESSING (parts of Chapter 9): Basic operations on binary images such as: dilation, erosion, opening and closing, various applications of morphological filters, Intro. to gray scale morphology, etc.

VII- IMAGE SEGMENTATION (parts of Chapter 10): Edge detection and linking, adaptive thresholding, region-based segmentation, use of motion, etc.

IX- ADDITIONAL, SPECIAL TOPICS (parts of Chapter 7, 11, 3-D image processing, 2-D DSP based on Lim book, etc.)