

Calendar for Image Understanding EN1610

Fall 2011, Prof. Benjamin Kimia

Week	Monday	Wednesday	Friday	Notes
1		Sept 7, L1 Introduction and Applications	Sept 9, L2 Pointwise image operations: Image storage, Thresholding, Discretization, Quantization	
2	Sept 12, L3 Histograms, Contrast Enhancement, Histogram Equalization, Sampling and interpolation	Sept 14, L4 Noise, Linear vs Nonlinear filters, Convolution, Implementation issues	Sept 16, L5 Computing image derivatives Smoothing, Block and Gaussian filtering, Median filtering	Lab 1 is due
3	Sept 19, L6 Smoothing and Edge Detection Deblurring, Lucy-Richardson Algorithm	Sept 21, L7 The Fourier Connection, Ideal Low Pass filtering, Gaussian Kernels, Separable Filters	Sept 23, L8 Features: Why features? Isolated point features vs linear edge-type features	Lab 2 is due
4	Sept 26, L9 Edge Detection, Sources of Edges, Gradient Computation, lateral non-max suppression and localization, Canny bi- level Thresholding	Sept 28, L10 Laplacian Edge Detectors, Three types of edges: intensity gradient, histogram gradient, texture gradient	Sept 30, L11** Technical details and problem session with Maruthi ** make up class: Corner Detection I	Lab 3 is due
5	Oct 3, L12 Corner Detection II: The M matrix, Cornerness measure R, corner detection, KLT tracker, Hough Transform Feature detection of lines and circles	Oct 5, L13 Feature matching by Normalized Cross Correlation, Histogram of intensity matching	Oct 7, L14 Stability, repeatability, and invariance of features with visual transformations Feature description	Lab 4 is due
6	Oct 10 Fall Day, No Class	Oct 12, L15 Automatic Scale Selection, SIFT Keypoints	Oct 14, L16** Technical details and problem session with Maruthi ** make up class SIFT descriptors, Template Matching	Lab 5 is due
7	Oct 17, L17 Bag of Words recognition model: k- means to generate a codebook, Hough transform voting	Oct 19, L18 Overview of lectures thus far, a perspective, nature of projects, a description of project themes	Oct 21 Mid Term Exam	
8	Oct 24, L19 Background Subtraction Morphological Filtering	Oct 26 Initial Project Presentations	Oct 28, L20 Performance Evaluation, History, TP, FP, TN, FN	
9	Oct 31, L21 Performance Evaluation: ROC, PR, Multidimensional parameter space	Nov 2, L22 Fast Indexing: vocabulary tree	Nov 4, L23 Stability of feature points	
10	Nov 7, L24 Image Formation Model I: Pin Hole Camera, Projection models	Nov 9, L25 Image Formation Model II: cameras with lenses, digital cameras	Nov 11, L26 Multiview Geometry I: Transformation of coordinates, Extrinsic and Intrinsic Camera calibration	
11	Nov 14, L27 Multiview Geometry II: Stereo, epipolar geometry, Correspondence, Feature matching	Nov 16, L28 Multiview Geometry III: RANSAC Representing vector cross product as a matrix multiplication	Nov 18, L29 Color I, Perception, Photoreceptors, Physics of color, use of color in applications	
12	Nov 21 Mid Project Presentations	Nov 23 Thanksgiving Break	Nov 25 Thanksgiving Break	
13	Nov 28, L30 Color II, Measurement of color, color matching, color spaces: RGB, XYZ, Lab	Nov 30, L31 Segmentation I: Thresholding, Seeded Region Growing, K-Means	Dec 2, L32 Review of Projects progress	
14	Dec 5, L33 Segmentation II: Mean Shift	Dec 7, L34 Segmentation III: Graph Cuts, MFMC	Dec 9, L35 REVIEW	
		Dec 21, 2:00pm Final Project Presentations	Happy Holidays	

