ECE 332 Introduction to Computer Vision– Fall 2019

`-- Let's leap the first step to make computers see!`

Instructor: Ying Wu (yingwu@eecs.northwestern.edu)
TA: Peixi Xiong (peixixiong2018@u.northwestern.edu)
Charikleia Iakovidou (CharikleiaIakovidou2020@u.northwestern.edu)

☐ What to learn?

- **Fundamentals on computer vision**: binary image processing, region segmentation, texture synthesis, edge detection, color, contour, motion analysis, visual tracking, geometry and stereo.
- **Profound understanding of math**: least square estimation, dynamic programming, eigenvalue decomposition, and maximum likelihood estimation.
- **Building your own tools**: connected region finder, morphological operators, histogram equalizer, color segmenter, Canny edge detector, texture generator, Hough transform, region tracker.

☐ How to achieve that?

- *No written exams!* but 7 machine problems (MPs);
- *Course projects*: there is a list of projects to choose from.

☐ Your grades?: MP (70%); 15-page projects report (30%); 10-min optional presentation (15%);

Parts	Week	Date	Lectures	Reading	MP Asn
Basic	W-1	09/24(Th)	Introduction	handout, Ch.1	
		09/26(Th)	Image geometry	handout, Ch.1	
	W-2	10/01(Tu)	Basic binary image analysis and CCL	Ch.2.1-2.5	MP#1
		10/03(Th)	Morphological operators and OCR	Ch.2.6-2.7	MP#2
	W-3	10/08(Tu)	Histogram techniques	handout	MP#3
		10/10(Th)	Color models & color segmentation	Ch. 10 & handout	MP#4
	W-4	10/15(Tu)	Face detection	handout	
		10/17(Th)	Texture modeling and synthesis	handout	
Core	W-5	10/22(Tu)	Region segmentation	Ch.3.1-3.5	
		10/24(Th)	Edge detection	Ch.5.1-5.4	MP#5
	W-6	10/29(Tu)	Contour and curve fitting	Ch.6.1-6.4	
		10/31(Th)	Hough transform	Ch.6.8	MP#6
	W-7	11/05(Tu)	Motion analysis	Ch.14.1-6	
		11/07(Th)	Object tracking	handout	MP#7
	W-8	11/12(Tu)	Camera calibration and pose estimation	Ch.12.1-12.10	
		11/14(Th)	Image stitching	handout	
Advc.	W-9	11/19(Tu)	Local visual features	handout	
		11/21(Th)	Stereo vision and 3D reconstruction	handout	
	W-10	11/26(Tu)	Basics in Object Recognition	handout	
		11/28(Th)	Thanksgiving Holiday		
	W-11	12/03(Tu)	Project presentations (I)		
		12/05(Th)	Project presentations (II)		