Computer Vision I Schedule

Class	Date	Topics, Readings, Assignments, Deadlines
1		Introduction to digital image formation, image sequence and digital video formation, understand a technique using C to manipulate digital images and avi videos, tools for image processing/video processing, Matlab (or open source equivalent Octave), and OpenCV etc. GPU computation platform.
2		2D convolution technique, human visual perception system, Lindberg Image L(x,y;s). Implementation on gcc and GPU platform. Feature characterization, Mean, covariance matrix.
3		2D convolution with LoG (Laplace of Gaussian) kernel and zero crossing for edge detection. DoG (Difference of Gaussian) images, Image Pyramid, maxima of DoG(x,y;s)， and Feature characterization.
4		Image binarization，binary image processing， floodfill algorithm, moments computations, and Hough, binary image processing for pattern recognition, shape cognition, and Implementations. Entropy minimization for feature selections.
5		Scale Invariant Feature Transform (SIFT) tracking technique, and implementation on gcc parallel cores and GPU. Entropy minimization for feature selections.
6		Image tracking techniques and case study. Function approximation based on Bayes theory.
7		Midterm and Function approximation based on Bayes theory.
8		Nonlinear pattern classifier based on Bayes decision and function approximation.
9		Image tracking applications. Image segmentation techniques and its applications in pattern recognition. Nonlinear pattern classifier based on Bayes decision and function approximation.
10		2D FFT and its power spectrum and phase spectrum. Perceptron neural networks.
11		Motion estimation and optic flow computation. Perceptron neural networks.
12		Comparative study, facial recognition techniques.