**Image Processing Project 3**

**Materials and Implementation of**

**(one week)**

**Image Processing Part**

1. Learn and compare the concept of edge detectors (e.g. Sobel,Robert,Prewitt,Laplacian,Canny… ) and the image segmentation. Please explain their function and list their applications.
2. Learn difference among methods of target detection, image recognition, image segmentation, and image classification (find one or two method for each of them).
3. Learn the morphological reconstruction: dilation and erosion. Then combine them to implement Opening and Closing methods. (Do some experiments like filling the holes and remove the edges of an image.)

**Machine Learning Part (The link is for reference only)**

1. Learn the common image datasets applied in deep learning, e.g., Imagenet, COCO common objects, Pascal VOC, MNIST, LFW(Labeled Faces in the Wild).
2. The deep learning book:

<http://neuralnetworksanddeeplearning.com/index.html>

1. Learn the concepts of chain rule/initialization and their roles in machine learning.
2. Learn the phenomenon of Vanishing gradient and Exploding gradient, and their solutions.
3. How to distinguish Relu, sigmoid, and tanh.
4. Learn the concepts of loss function and take some examples.
5. Understand the principle of CNN, and to distinguish it with DNN and RNN.

**Submission:**

(1) You should show me a project report with your source codes as appendix. One sample reports is attached for your reference.

(2) You are expected to give a 20-minute presentation in English to me (recommended) such that I will know how much you have learnt from the project. You also are recommended to send your PPT file to me before the presentation day.