

HOMEWORK ASSIGNMENT #4

Hough Transform

Due Date: 11:59am on 05/15/2019

Please read the submission guideline carefully before getting started. All images in this homework can be downloaded from our class website: https://ceiba.ntu.edu.tw/1072_DIP. Images are in the raw file format. The size of each image is listed in the appendix.

For MATLAB users, you are **NOT** allowed to use the MATLAB Image Processing toolbox except the `imshow()` and `image()` functions.

PROBLEM 1: Hough transform for line detection



The input image, I_1

- (a) Please perform edge detection on I_1 and output the resultant edge map as E .
- (b) Perform Hough transform on E and output the accumulator array as a new image, H_1 , where the horizontal axis and vertical axis represent theta and rho values, respectively.
- (c) Please perform contrast adjustment on H_1 and output the result as H_2 for better visualization.
- (d) By utilizing the accumulator array, draw the top 10 and top 20 significant lines with different colors on the edge map E and output the resultant images as D_1 and D_2 , respectively. Please provide discussions about the pros and cons of Hough transform.

Appendix:

Problem1: MORPHOLOGICAL PROCESSING

sample1.raw

Fig. 1

256×256 image

gray-scale