

## HOMework ASSIGNMENT #2

### Edge Detection and Geometrical Modification

**Due Date: 9:00pm on 10/30/2013**

Please read the submission guideline (posted on the class website) carefully before getting started.

All images in this homework can be downloaded from our class website: <http://ceiba.ntu.edu.tw/1021DIP>. 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: EDGE DETECTION

In this problem, please generate three edge maps of a given image (as shown in Fig. 1) by adopting Canny edge detection and two other different edge detection algorithms chosen by yourself. Please mark edge points with intensity value 1 and background points with intensity value 0.

- (a) For each method, please try different parameters and provide some discussions on how they would affect the resultant edge map.
- (b) For each method, try to generate an edge map with best quality and specify the corresponding parameters along with the reason why you claim it is the best.
- (c) Compare the three edge maps you obtained and provide some discussions based on your findings.



Fig. 1 Sample1.raw

## PROBLEM 2: GEOMETRICAL MODIFICATION

A fisheye lens is a wide-angle lens which creates a wide panoramic image with strong visual distortion. In this problem, a fisheye image is given in Fig. 2(a). Please design a warp function to convert the fisheye image to a panorama image as shown in Fig. 2(b). Please show your warping result and describe your method step by step as well as the mapping equations if any are applicable.



Fig. 2(a) sample2.raw



Fig. 2(b) The panorama

## Appendix: Image files

Problem1: EDGE DETECTION

sample1.raw

Fig. 1

512 x 512 image

gray-scale

Problem2: GEOMETRICAL MODIFICATION

sample2.raw

Fig. 2

723 x 723 image

gray-scale