CAP 4453: Fall 2014 ROBOT VISION

Assignment 1

Due: Friday, Sep 5, 2014

A. (5 points) Modify the Sobel program to do thresholding on the gradient magnitude output to find edge points, and run it on the image face05. Produce three output images: one showing the magnitude of the gradient, one black/white image showing where the magnitude exceeds a liberal (low) threshold so that all the correct edges are in, and the last one a black/white image showing where the magnitude exceeds a restrictive (high) threshold so that only true outline fragments are shown. You can use and modify the code in sobel.c from the web-page. Write your program in a manner such that it only has to run once to produce the three output images.

B. (90 points) Write a program for the following. Implement the Canny edge detector to accept as input a value for sigma. Run it on garb34. Produce three output images: one showing the magnitude of the gradient (scaled to fit within the range $0 - 255$), one black/white image showing where candidates (the peaks) exist, and the final black/white image showing the result of double-thresholding these candidates. Include code that automatically selects the HIGH and LOW thresholds. So, you will input to the program a percentage number that will be used to compute the thresholds. Print to the screen the values the program chooses for these thresholds. Run your program for sigma = 1.0, and show the output.

NOTE-1: All programs and images are available at www.cs.ucf.edu/courses/cap4453
NOTE-2: Be prepared to turn in and demo the programs and output images.
C. (5 points) Go to the Computer Vision Home Page at

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www.cs.cmu.edu/~cil/vision.html
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Explore the site. Write two or three sentences for each of the following members within each of the following links.
Four research groups; two test images; two hardware; two related links.
Hand in a hardcopy report (about one page, Max two pages).