INTRODUCTION TO IMAGE PROCESSING

2014-2015 – FALL

DUE : 29 December 2014

HOMEWORK 3

Submit ONE SINGLE PDF FILE on DYS. Any material that is not in your PDF document will NOT be graded.

Label all axis for plots and bars. Put a descriptive title on plots, bars and images.

Include all the MATLAB code in your homework (in the PDF file).

Display the original and processed images in your homework. Put informative captions under the images.

Each homework should be done individually. You will suffer a significant GRADE REDUCTION if you submit very similar material.

GLOBAL AND ADAPTIVE THRESHOLDING

Consider the image "document1.bmp":

Step 1: Apply OTSU's thresholding method to the image, using MATLAB functions "graythresh" and "im2bw". Report the threshold returned by the "graythresh" function and display the thresholded image. Is it possible to extract all the characters from the resulting binary image?

Step 2: Try a couple of other threshold values on this image, and display the results. Can you find a global threshold that will make it possible to extract all the characters from the resulting binary image?

Step 3: Write a MATLAB program that calculates the local mean of NxN neighborhood of each pixel. In other words, you are going to calculate a matrix M:

M(i,j) = mean(NxN window of the original image centered at pixel location (i,j))

Display the resulting image M. You can replicate the border pixels using MATLAB's padarray function. Choose N as 7.

Step 4: Apply the following thresholding scheme to the original image I :

BW(i,j) = 1 if I(i,j) > M(i,j)

BW(i,j) = 0 otherwise

Display the resulting binary image BW. Comment on the result.

Step 5: This time, apply the following thresholding scheme to the original image I:

BW(i,j) = 1 if I(i,j) > M(i,j) - 10

BW(i,j) = 0 otherwise

Display the resulting binary image BW. Comment on the result.