Aum Amriteshwaryai Namah

15CSE363 - Principles of Digital Image Processing

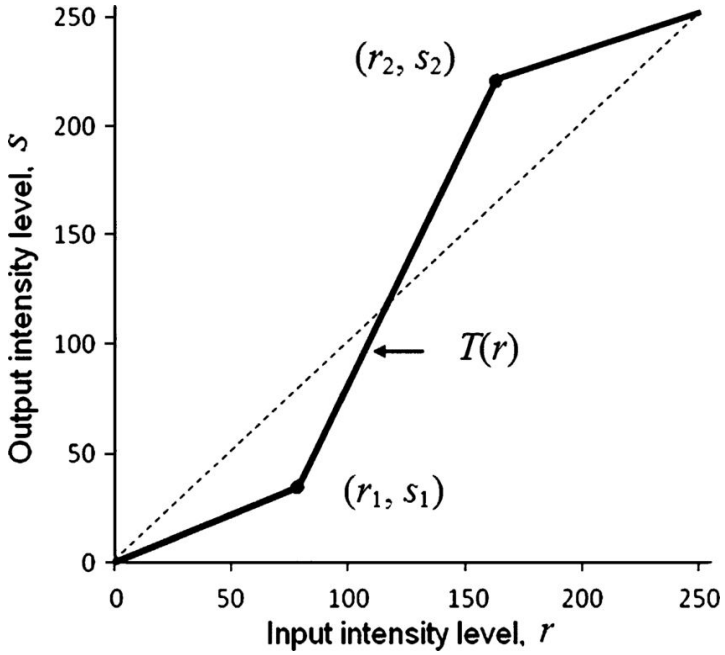
Assignment 2

Q1. Estimate the transformation function required for transforming the image ‘inputq1.jpeg’ to match the image ‘transformed.jpeg’.

a) Plot/Draw the transformation function
b) Apply the transformation function and store the resulting image as ‘outputq1.jpeg’

Q2. Consider the input image: ‘logndlinear.jpg’

a) The general form of the log transformation is s = c log(1 + r). Apply this transformation to the input image such that
   C = 255/(log (1 + m)), where m is the maximum pixel value in the image
   Store the result as ‘logq2.jpg’
b) Apply the following transformation function to the input image



Set the values of r1, s1, r2 and s2 as:
r1 = 70
s1 = 0
r2 = 140
s2 = 255

Q3. Perform shading correction on the image ‘ChessBoardGrad.png’. Store the estimate of shading error as ‘shading.png’ and corrected image as ‘corrected.png’

Q4. Consider the input image: 1200px-Monarch_In_May.jpg. Convert this image to grayscale and apply the following transformations:

a) Laplacian
b) Laplacian of Gaussian (gaussian filter of size 3x3)

Save and compare the resulting images. Comment on the differences

Q5. Consider the input images: ‘ChessBoardGrad.png’ and ‘Lenna.png’
Apply the following to both the images:

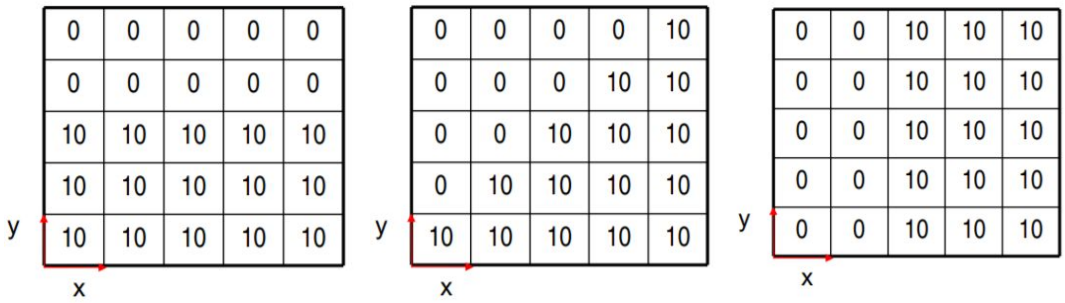
a) Laplacian kernel
b) Sobel kernel in x direction
c) Sobel kernel in y direction
d) Canny edge detection

Save and compare the resulting images. Comment on the differences

Q6. Consider the input image: ‘lowContrast.png’

a) Plot its histogram and save the plot
b) Perform histogram equalisation and save the equalised image
c) Plot the equalised histogram and save the plot

Q7. Compute Gx and Gy, gradients of the image by performing the convolution of Sobel kernels with the following images:



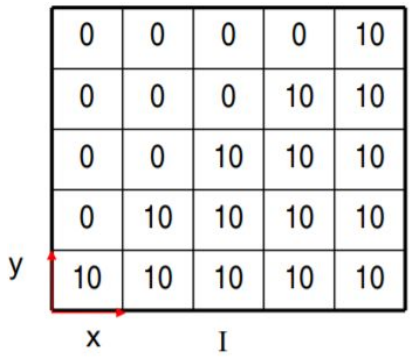
0	0	0	0	0
0	0	0	0	0
10	10	10	10	10
10	10	10	10	10
10	10	10	10	10

0	0	0	0	10
0	0	0	10	10
0	0	10	10	10
0	10	10	10	10
10	10	10	10	10

0	0	10	10	10
0	0	10	10	10
0	0	10	10	10
0	0	10	10	10
0	0	10	10	10

Note: Use border values to extend the image

Q8. Compute the convolution of image I with the Laplacian kernel. Use border values to extend the image



0	0	0	0	10
0	0	0	10	10
0	0	10	10	10
0	10	10	10	10
10	10	10	10	10

Apply both these kernels:

0	1	0
1	−4	1
0	1	0

1	1	1
1	−8	1
1	1	1