German University in Cairo
Faculty of Media Engineering and Technology
Winter 2019

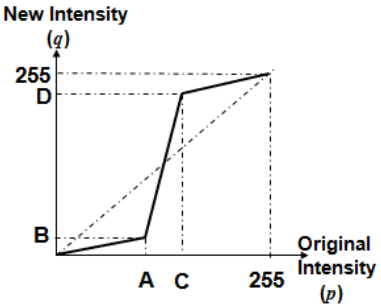
DMET 901 – Computer Vision

Assignment #1

(Due on Thursday, October 17 at mid-night)

Problem 1

Implement a function to increase the contrast of any gray-scale image according to the transformation given below and compute the contrast using the co-occurrence matrix measure given in lectures. The function should take as inputs the gray-scale image in addition to the parameters A, B, C and D. The function should output the transformed image. Apply your function to the "Ocean.bmp" image.



Deliverables:

- Your code.
- A .bmp file for the transformed image with (a) A=30, B=20, C=180 and D=230 and (b) A=70, B=20, C=140 and D=240. Name the files "Ocean_a.bmp" and "Ocean_b.bmp".
- A text file containing the contrast value for both images. Name the file "contrast.txt".

Problem 2

a) Implement the integral image algorithm that can obtain the integral image for any gray-scale image. Apply your function to the image "cameraman.tif". Your function should take the image as an input and should output the integral image.

Deliverables:

- Your code.
- The integral image obtained for the "cameraman.tif" image. Name the file "Camera_Integ.jpg"

b) Implement an average filter for noise removal that uses the function you wrote in (a). Apply your function to the image "cameraman.tif". Your function should take the image as an input in addition to the size of the filter (s x s). The function should output the filtered image.

Deliverables:

- Your code.
- The filtered image obtained for a filter size of 3 x 3. Name the file "Camera_Filt_3.jpg"
- The filtered image obtained for a filter size of 5 x 5. Name the file "Camera_Filt_5.jpg"

c) What is the advantage of using the integral image for average filtering compared to traditional convolution implementation of average filtering?