Image Processing
Spring 2025
LAB NO: 04

Name	
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Date	

In case if you are struggling to find pictures, you may download all the figures given in Chapter 3 of our textbook from the following link
http://www.imageprocessingplace.com/DIP-3E/dip3e_book_images_downloads.htm

In this lab, you will practice the following topics

a. Image flipping
b. Intensity transformation
c. Bit plane slicing

Image flipping

1. Create a function that takes a color image as input and produces the output shown below

input image

output image

2. Create a function that takes an image as input and produce mirror effect such as shown in figure below

input image

output image

In Matlab, if you want to combine two matrices of same size, the command is
C = [A B];

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Intensity transformation

1. Perform image negative on all the images provided in downloaded folder to see the effect.
2. Try obtaining the group of curves similar to the one given in figure below by using
    a. Non-normalized image with intensities in the range of 0-255. Note that in this case, the curves will not meet at the point y=L-1=255. Find the reason why it happens.
    b. Normalize the image and try getting the group of curves now. Note that the curves will meet at y=1 this time. Find the reason of joining of curves in case of normalized image.

Note: The values of γ should be 0.02, 0.2, .5, .8, 1, 2, 3, 3.5 and 4. You can use plot function of Matlab. Plot function has the following syntax
plot(x,y);

Where x and y are arrays containing values of x and y axes respectively. Values of x for the case of non-normalized image can be obtained using

x=0:255;

for the case of normalized image

x=0:0.001:1;

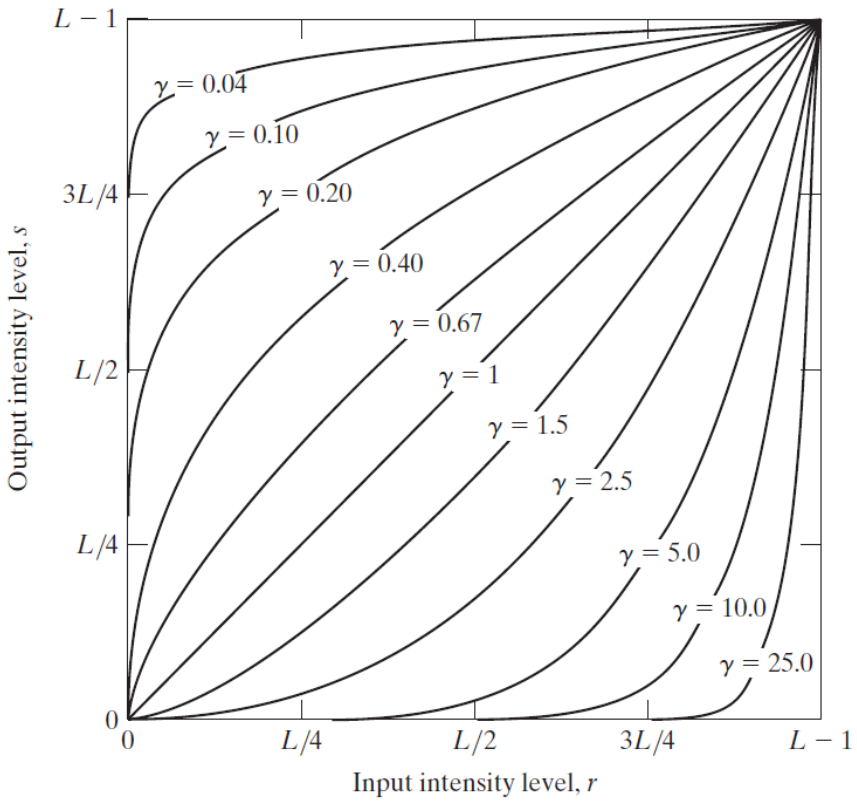

FIGURE 3.6 Plots of the equation $s = cr^{\gamma}$ for various values of γ ($c = 1$ in all cases). All curves were scaled to fit in the range shown.

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3. Apply gamma correction algorithm on set of images downloaded. Also, download at least two images from internet that needs gamma correction and apply correction to them.
4. Create a function that takes A and B as input, assign L-1 to those intensities that fall in the range of [A, B]. You can use find function to get those indices where we have intensities in the required range.
5. Try applying appropriate transformation with appropriate parameters to enhance the images uploaded with this manual.
6. Work on the folder “Images to play with” and analyze what parameters are reasonable for any selected image.

Bit-plane slicing

Please read the concept of “Bit-plane slicing” before working on this task

1. The function bitget takes name of image and the position of bit as input and return a binary image that show contribution of that bit in the formation of the image. Write a function named **displayBitResponse** that takes an image as input and show all eight binary images. The expected output is given below