CSP780 Computer Vision

Lab Assignment No 1: **Image Resizing and Interpolation**

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1. Find the attached database of standard test images and select the gray scale 'lena_gray_512.tif' image of dimension 512×512 pixels. Perform the following operations:

(a) Reduce the image size by downsampling to 256×256, name this image as 'reduce_lena_256.tif'.

(b) Compare the reduced image 'reduced_lena_256.tif'with the given image in the database 'lena_gray_256.tif' by finding the PSNR values between them. Also plot the image showing MSE difference for the same.

(c) Now again resize the computed image 'reduced_lena_256.tif' to original dimension 512×512 pixel using these methods:

- Nearest Neighbour Interpolation
- Bilinear Interpolation
- Bicubic Interpolation (bonus)

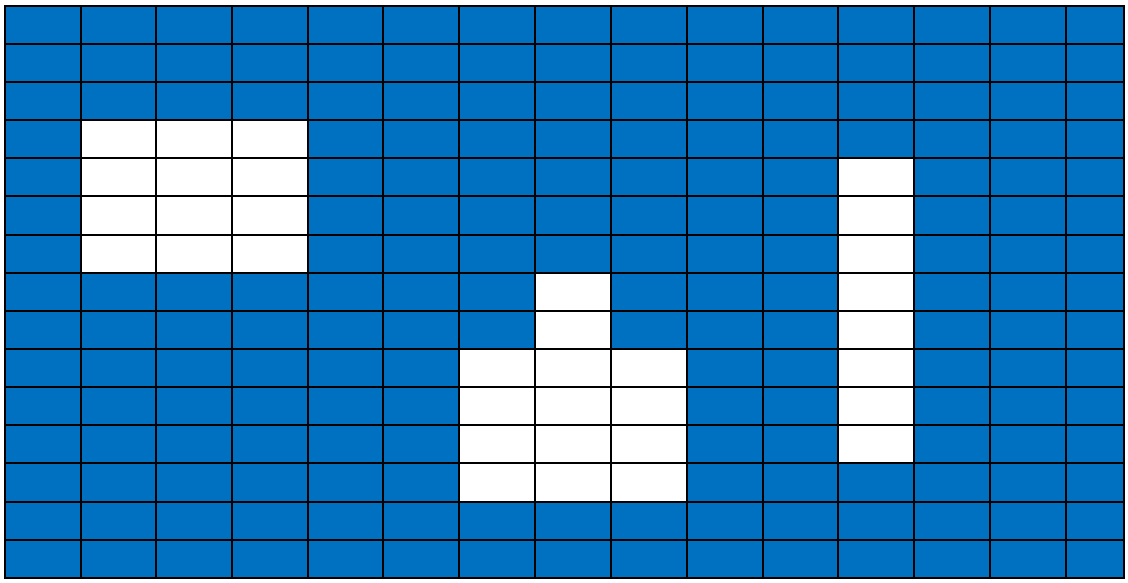
Note: you need to write functions for them and not use inbuilt ones.

(d) Compute the PSNR values between the original image and the resized image (both of dimension 512×512 pixels) obtained after methods suggested in step (c). Also plot the MSE difference image.

2. Write a program that takes an input image and performs various affine operations on it
a. Takes an input image and scales it up by a factor of 2.
b. Rotates the image by 90 and 180 degrees.
c. Performs horizontal shear by some amount.

3. Write a program that :

a. generates an input black and white image of dimension 128x128 which has n=3 components



You may create your own random image, by choosing your favourite locations to have value=1.

b. Now write a function that takes the input image and labels all the connected components of this image using M-connectivity.

Useful links: https://www.youtube.com/watch?v=dkp4wUhCwR4&t=138s