

Image Processing

Homework 2

Problem 1(10points):

What effect would setting to zero the lower-order bit planes have on the **histogram** of an image in general? Why? What would be the effect on the **histogram** if we set to zero the higher-order bit planes instead? Why? Write a Matlab program to verify your argument with LENNA.JPG. Does the outcome of your experiment support your argument? You may use any built-in functions for this experiment.

* Image source: <https://users.math.yale.edu/YCM/IMAGES/GCOMPRES/LENNA/LENNAO.HTM>

Problem 2 (10 points):

Implement your own Matlab function which performs RGB histogram matching on color images. Your function takes two color images as the input, the first one being the image to be re-mapped and the second one being the target image. In your function, you should not make function calls to predefined histogram-related functions. The output of the function is the RGB remapped image. Test your function with *Atlas-Mercury.png* and *techno-trousers.png*. To verify the correctness of the output, compare your result with the output of `imhistmatch(.)` in a "scientific" way. Include the comparison in the report.

Problem 3 (10 points):

In a given application an averaging mask is applied to input images to reduce noise, and then a Laplacian mask is applied to enhance small details. Would the result be the same if the order of these operations were reversed? Why? Write a Matlab program to verify your argument with LENNA.JPG. How does the outcome of your experiment support your argument? You may use any built-in functions for this experiment.

To Submit:

- You are highly encouraged to pair up with another student to complete this homework.
- At the end of your report, please include a section titled: "Resources that Helped Me."

- Submit one single **.zip** file (NOT .rar or .tar.gz), containing well-documented Matlab files (.m) and the report. It is preferred that the file is named "LastNames-HW.zip".
- Only one submission per group, and **full names** of the members should be included in the Comments box of the submission page on Blackboard.