

Homework 1

In this homework assignment, you will write a program to do Histogram Equalization for a color image.

Step 1. Write a function, called `myHEQ_RGB(img)`, to apply histogram equalization directly on a color image.

- (1) Split the RGB channels into three, each of which is a grayscale image;
- (2) Apply equalization on each individual channel;
- (3) Merge the enhanced new channels;
- (4) Show the result in a window named "HEQ_RGB"

Step 2. Write a function, called `myHEQ_YCRCB(img)`, to apply histogram equalization on the Y channel of a color image.

- (1) Convert the RGB representation to YCrCb representation;
- (2) Apply equalization on the Y channel;
- (3) Merge the new Y channel with the other two channels;
- (4) Convert the image back to RGB mode.
- (5) Show the result in a window named "HEQ_YCRCB"

Step 3. Develop a ROI (Region of Interest) Selection Tool and apply Local Equalization:

- (1) Implement a mouse-event handling function to allow user to select a rectangular region of Interest (ROI) in the image.
- (2) Use "`myHEQ_YCRCB()`" to equalize the ROI region and get an enhanced patch
- (3) Update the ROI in the image using this new enhanced patch
- (4) Show the final result in a window named "HEQ_ROI"

Finally, Save your enhanced images to "HEQ_RGB.png", "HEQ_YCRCB.png", and "HEQ_ROI.png" respectively

Testing: Test your Step 1 and 2 using two under exposed images. And test your Step 3 program using the NikonContest2016Winner and portrait images.

Your codes and resultant images are due: 11:59pm, Feb. 3rd.

Submit your homework on Moodle.

If you are late for k ($k < 7$) days, your score will be calculated as:

Final homework score = (The score based on your codes) $\times 0.95^k$

If you are late for more than 7 days, you get no score.