

HW1 - Histogram Equalization and Image Coloring

Due 10/1/2024

1 Introduction

This homework is design to test your knowledge on how images are created and can be manipulated. There are two parts to this assignment.

2 Part 1: Histogram Equalization (50 points)

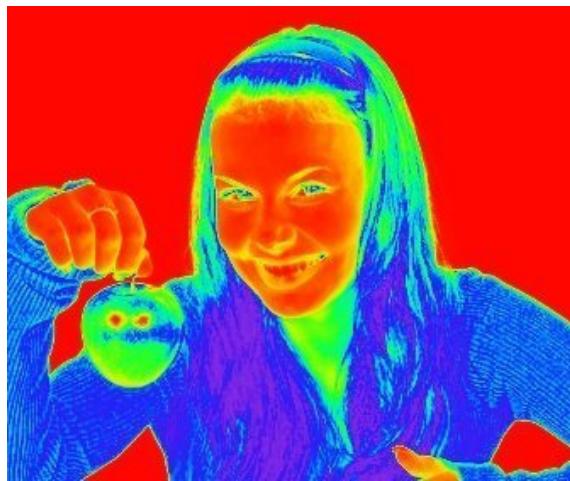
Download dark-image from Canvas and perform a histogram equalization on it. You must write your own code to calculate the Counting, CDF and Mapping of the old values to new values. Use cv2.equalizeHist to compare results to.

Grading (Out of 50 points)

- 5 Points : Add your name and date to the beginning of your code.
- 5 Points : Use appropriate comments throughout your code.
- 30 Points : Your results look similar to what cv2.equalizeHist creates.
- 10 Points : Find a new image online that is either too dark or too light and run your algorithm on that to see the results. Make sure that you upload this new image when you submit your HW.

3 Part 2: Image Coloring (50 points)

Basic image filter and editing is about changing the colors of the original image. Old school phone cameras had a "thermal vision" camera filter.



Example "thermal image"

However, there was no way that the camera could actually detect how hot something was. How it actually worked is that the lighter the image was, the "hotter" (red) it would look. The darker the image is, the "colder" (blue) the image looked. The average brightness the image was colored "green".

You are tasked with taking in the followers image from canvas and converting it to a "thermal image" using your own code. **No pre-built OpenCV functions!**

Hint: How do you determine brightness of a pixel? (in notes).

brightest value = red = [0,0,255]

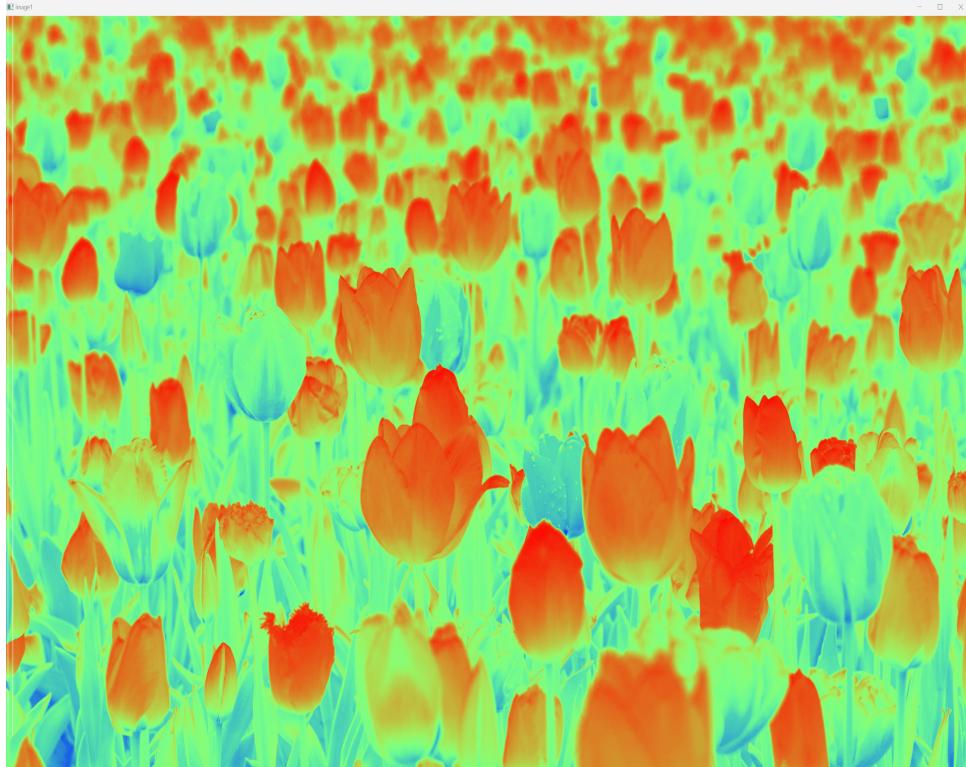
darkest value = blue = [255,0,0]

average value = green = [127,255,127]

Grading (Out of 50 points)

- 5 Points : Add your name and date to the beginning of your code.
- 5 Points : Use appropriate comments throughout your code.
- 30 Points : Your output is close to the example output below.
- 10 Points : Find a new image online and run your code on it. Make sure that you upload this new image when you submit your HW.

Example output:



4 How to turn in

You must submit a zip folder that includes all files, folders, and images that are required to run your program. Name the zip folder "HW1-Lastname.zip" and upload it to canvas.

Good Luck Cat!

