Computer Vision Assignment

Each of the items below will require you to perform a task and you will need to research how to accomplish those tasks. Just like 'real world' job tasks there is no textbook to guide you through all of the steps. There are however several resources you can use to help steer you through the lab, some examples are: google, chatGPT, programming library documentation, etc. As you progress through the lab, screenshot each of the plot/displays you generate (and appropriately label them) and place them in a single word document along with the answer to the questions.

1. Download a color digital image (or copy one from your phone). Read in the image using a python script, specifically use the PIL library.

2. Display the image to the screen.

3. Display the image at different resolutions, small, medium, large (you may select the actual dimensions). Display them on separate plots/windows.

4. Repeat step 3, but this time place all 3 images on a single plot/window.

5. What software library did you use to display the images?

6. Display the red, green, and blue channel along with the original image in the same display window (so 1 by 4)

7. Calculate the histogram manually (i.e., don't use a software library to calculate it). You can accomplish this by creating a double for loop that steps through the matrix (image) and counts the value for each channel. You should create a histogram for each of the 3 color channels (Red, Green, Blue). Display each of the histograms.

8. Binning places all the values within a range inside a certain bin. For example, if the bin was from 0-4, all the image intensity values that fall in the range 0-4 would count for that bin. Recalculate the histogram, but this time using bins 0-4, 5-9, 10-14, etc.

9. Display the binned histogram for each of the colors.

10. Create a custom 3x3 smoothing filter and apply it to the image. Output the resulting image and the original image in the same window. (Note: by custom I mean define what the 3x3 matrix is).

Submit the word/pdf document with the answer to your questions and your display outputs. Submit your source code as a separate file.