EE610 Image Processing

Indian Institute of Technology Bombay, July-Nov 2022

Assignment 1: Image Enhancement

Instructions:

- The following assignment can be done in Google Colab
- Only the .ipynb file needs to be submitted by Aug 21, 2022.
- Each line of code should have explanatory comments on what that line is for, and citation to any source from which it was copied
- At the end of the assignment, please list the sources of inspiration or information
- You can use OpenCV image processing library, unless noted otherwise in the assignment statement

Questions:

1. Read a color image of your own in jpg format, display it, and print its shape. Comment on what the dimensions correspond to. [.5]
2. Print the pixel intensities of a small section of the main image, check how various ranges are addressed, and comment on where the origin of the image is. [.5]
3. Overwrite the values in the small window with 255 and display the new image and comment. [.5]
4. Overwrite the values in the small window with 256 and display the new image and comment. [.5]
5. Crop a margin of a few pixels from all four sides and store the cropped image in a new image array, and display the cropped image. [.5]
6. Save it as a new image file in png format. [.5]
7. Add 50 to all the pixel values of the original image, display the new image and comment on the results. [.5]
8. Invert the y-axis to create a mirror image and display it. [.5]
9. Take a night shot of your own, convert it to greyscale, and display its histogram. [.5]
10. Brighten the image by multiplying pixel values with a>1, and find a good value of a. [.5]
11. Try to enhance it using power transform, display results for different gammas, and find the best (subjective) gamma. [.5]
12. Perform histogram equalization to enhance it and display the histogram. Comment on why the histogram is not flat. [.5]
13. Think of a good target histogram and do histogram specification (histogram matching). [1]