Homework reports

Course: Computer Vision 2020

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# Lab 3 (Topics: Image Equalization, Histograms, Filters, Morphological Operators)

My Lab 3 code is inside source file homework\_3.cpp with some utility functions inside utils.cpp for the histogram visualization.

### Part 1: Histogram Equalization

In this part of the homework I successfully saw the result of the histogram equalization in both RGB space and HSV space. The OpenCV instruction that I used for the equalization is equalizeHist, to show the histogram I added a function named generate\_show\_histograms

which separates the three channels of the image and generates the histogram images using the function provided by the prof.

After the equalization I noticed how the histogram is more evenly distributed across the intensity values, consequently underexposed images are brightened up and overexposed ones are darkened in both RGB and HSV space.

In the equalization in HSV space the best results are obtained by equalizing the value channel whereas, when only hue or saturation channels are equalized, underexposed or overexposed images are not corrected since the intensity values remains the same so brightness remains unchanged. By comparing the results of the equalization in RGB space with respect to the results in HSV space, I noticed how the latter has a better color fidelity and closer to natural colors, whereas the RGB equalized one is more greyish.

### Part 2: Image Filtering

In this part of the homework I successfully obtained the filtering of the equalized input image. Three filtering methods are applied on the image to see the differences between different types of filtering with the different parameters configurable with a set of trackbars.