

Report Lab 2 - Computer Vision

Urbani Tommaso - 2045244

1 Histogram Equalization

First I uploaded the image, then using the function *split* it was possible to divide the image in the three channel (B, G and R). To calculate the histograms I used the function *calcHist* applied for each channel, and to visualize it I used the provided function *showHistogram*.

In the task 3 I had to equalize each channel, I used the function *equalizeHist* and then I re-calculated each equalized histogram with the function *calcHist*.

In the last task I converted the image in a different color space: Lab. As before I split the image in the three channels, in this case L, a and b. Then I equalized only the luminance channel.

To calculate the new histograms I created three new channels where the first one is the equalized luminance. I calculated the histograms with the function *calcHist* and displayed the histograms as before.

Then i merged the three channels into a new *Mat* and displayed the image after converting from Lab color space to BGR.

2 Image Fitering

Median filter The first filter applied is the median filter, I used the function *medianBlur* from openCV which has only one parameter: the kernel size. A bigger kernel size leads to a more blurred image.

Gaussian Blur The Gaussian blur is the second filter, with the openCV function *GaussianBlur* I applied the filter to the image. It's possible to regulate the filter with two parameters: the kernel size and the sigma value.

Bilateral filter The last filter applied is the bilateral filter I used the function *bilateralFilter* which has three parameters: the kernel size, sigma range and sigma space.

I used the trackbars creating a trackbar for each parameter of each filter using the openCV function *createTrackbar*. For each filter I created a function to manage the parameters and to display the filtered image with the updated parameters.

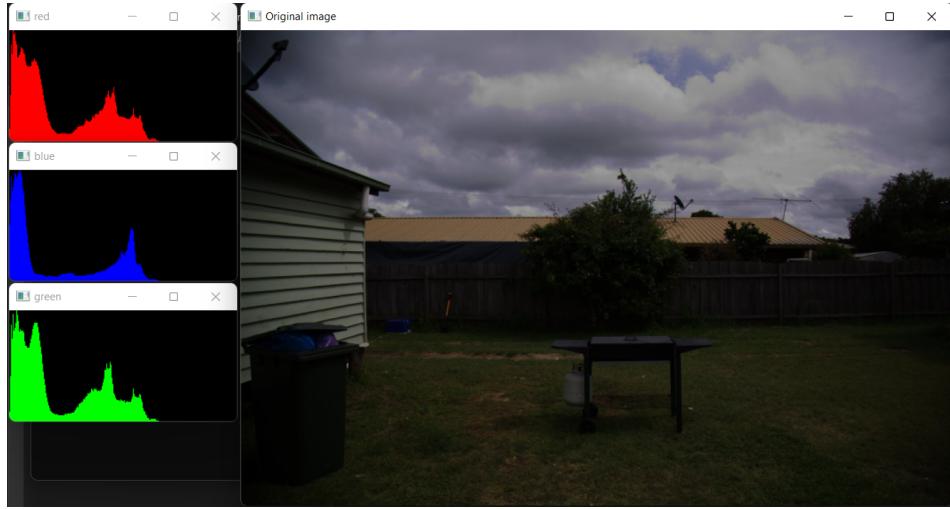


Figure 1: Original image with histograms

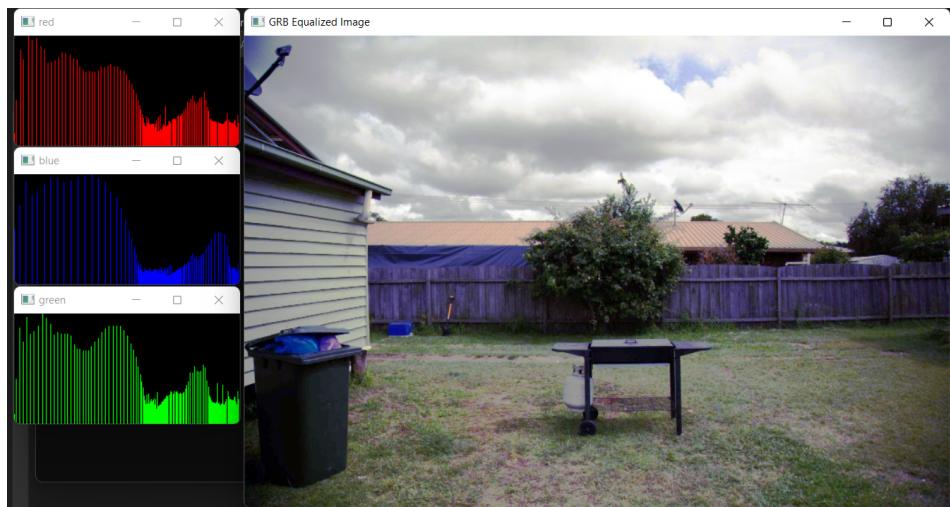


Figure 2: RGB Equalized

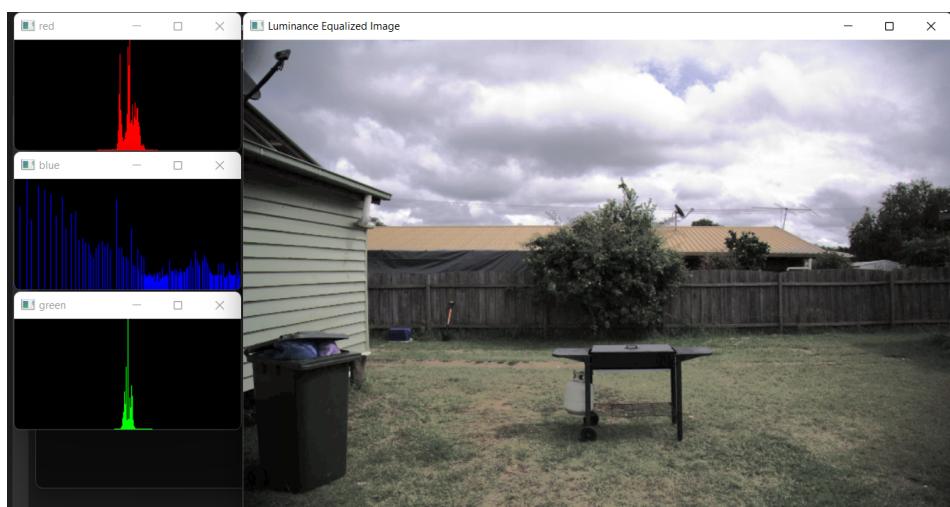


Figure 3: Luminance Equalized

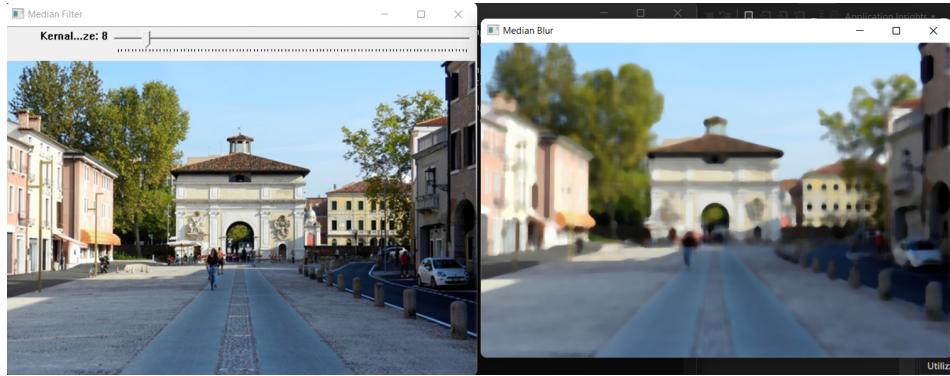


Figure 4: Median filter

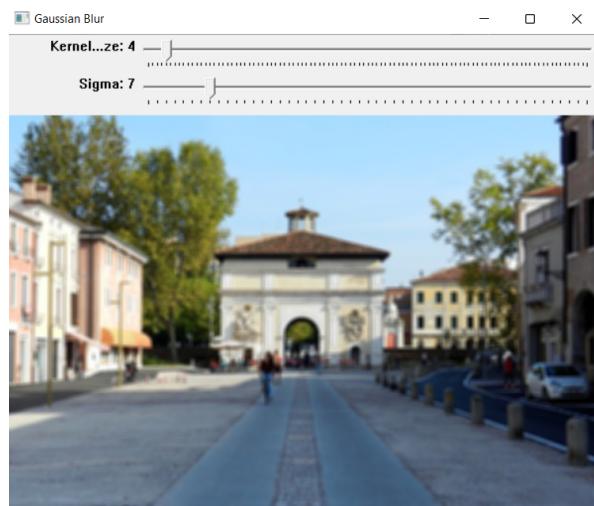


Figure 5: Gaussian blur

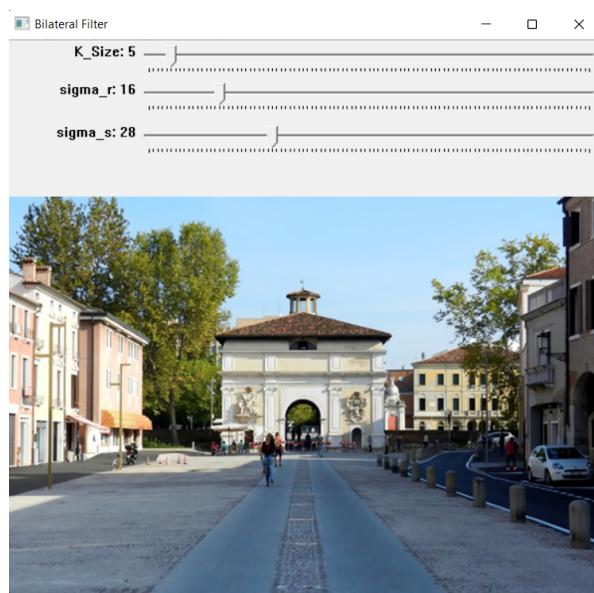


Figure 6: Bilateral filter