

Computer Vision 2021 Lab 3

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1 Goal

Experiment with histogram equalization, image filtering and morphological operators.

2 Implementation

The implementation closely follows the provided guide for the homework.

For part 1 step 5, the Value channel has been chosen to be equalized. This was an initial guess, validated by testing the equalization on the other two channels and verifying that the results were worse.

For the step 2, the provided Filter class has been tweaked to allow for better separation of concerns between the derived class filters. I attempted to make the Filter class generic over the parameters types but that was undone because of complications with the trackbar callback. The best filtering results for each provided input image have been reported below. Only the bilateral filter results are shown because they are strictly better than Gaussian and median filter results. The σ_s parameter was always set as high as possible (the limitation was only the computation time) and σ_r was tuned for each image, so to remove the blocky artifacts caused by histogram equalization but keeping as much detail as possible.

For part 3, I first tested erode, dilate, open, and close operators with a rect structuring element and identified that close performed better. Then the structuring element has been created from scratch: the size has been limited to 5x5 to avoid damaging too much the image; the element contains a vertical bar (one pixel wide) which is used to remove the electric cables; the corners have been added to better remove the barbecue handle, because the vertical bar was not enough. Despite the efforts, the final image lost much of its shadows and contours (because of the open operator).

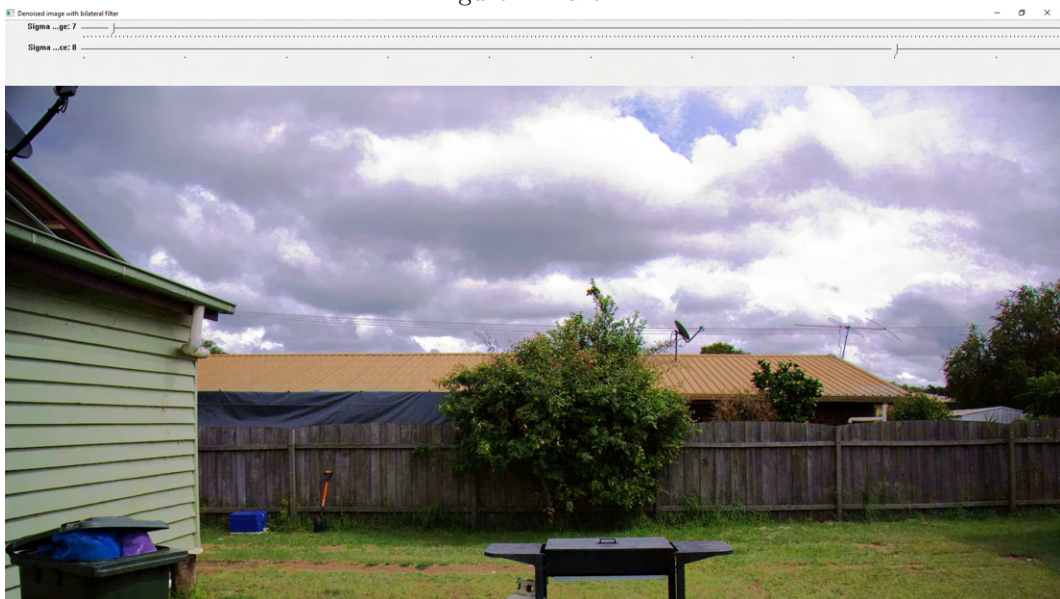
3 Results

Figure 1: Part 1

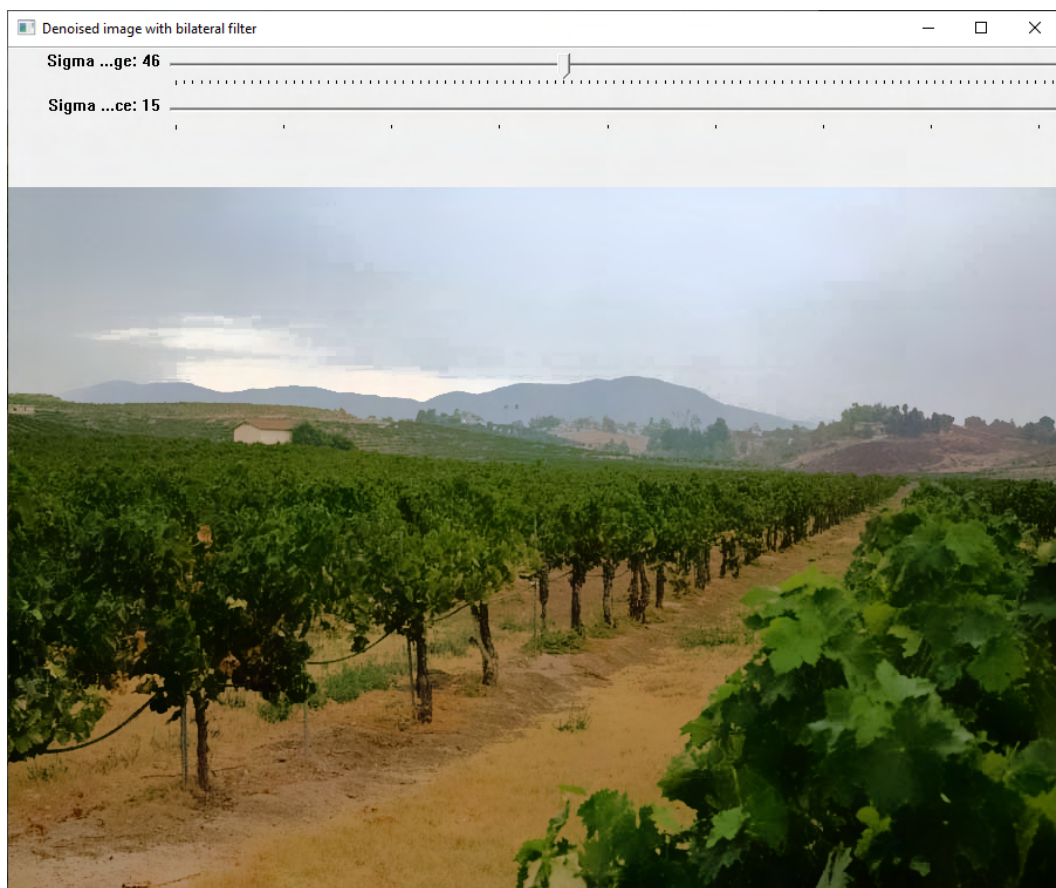


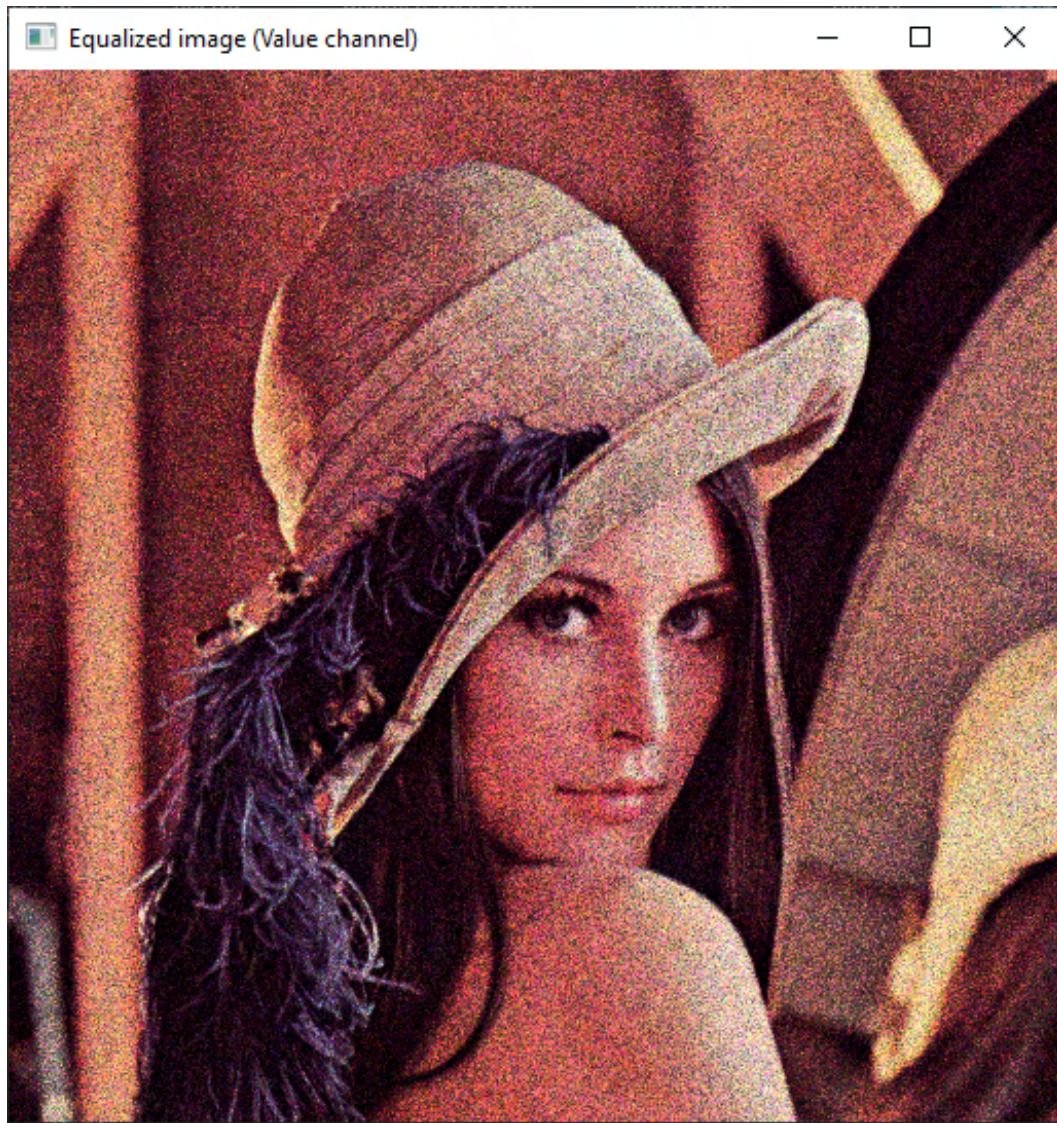


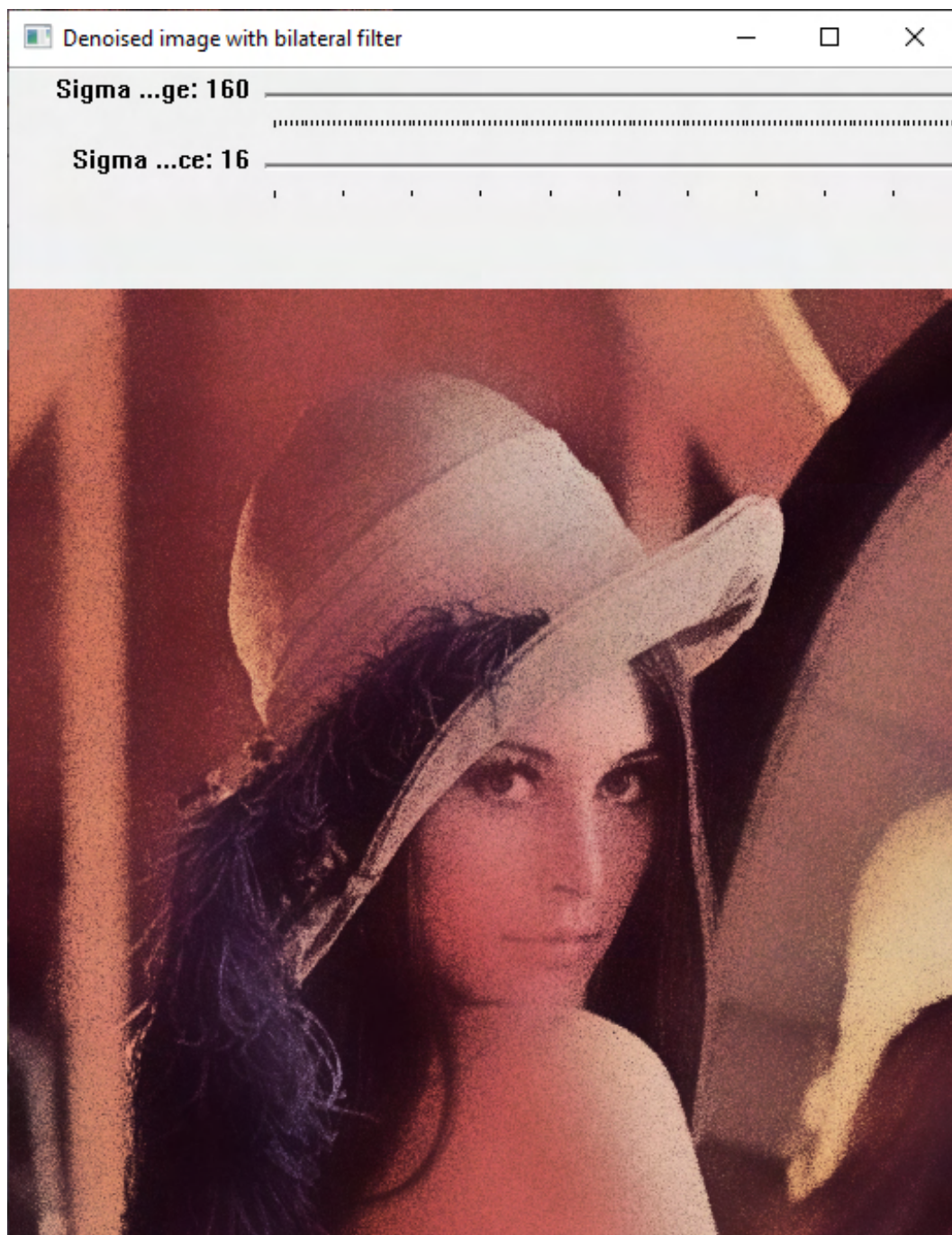
Figure 2: Part 2











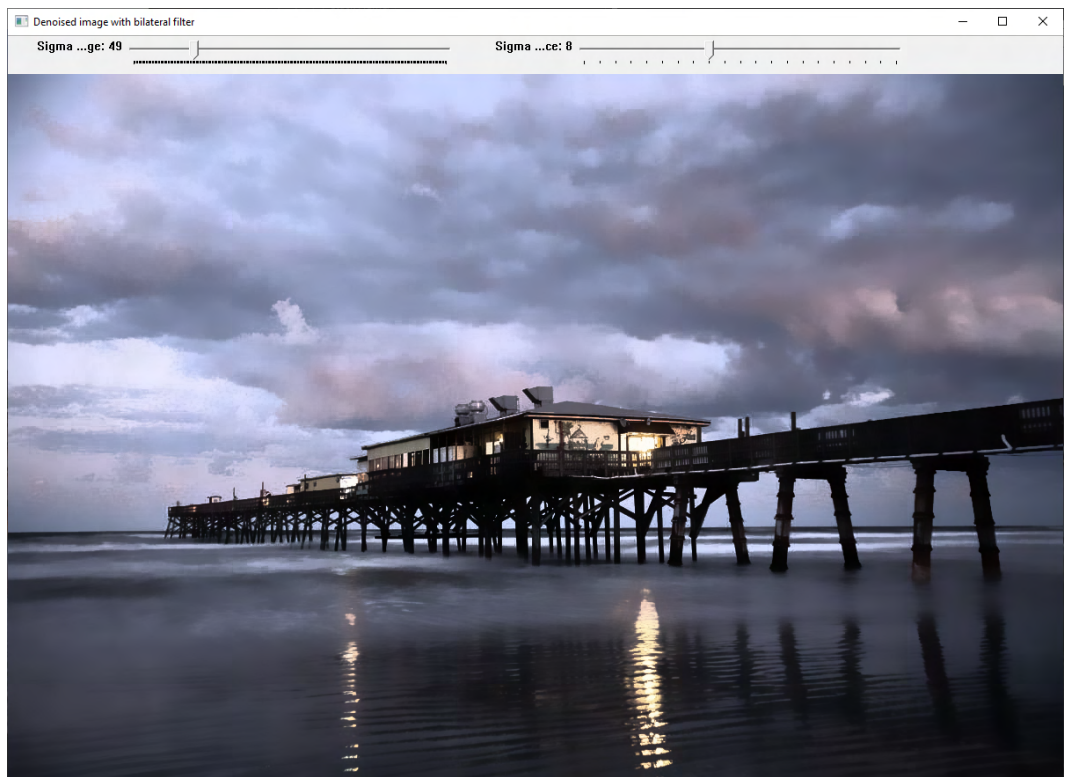
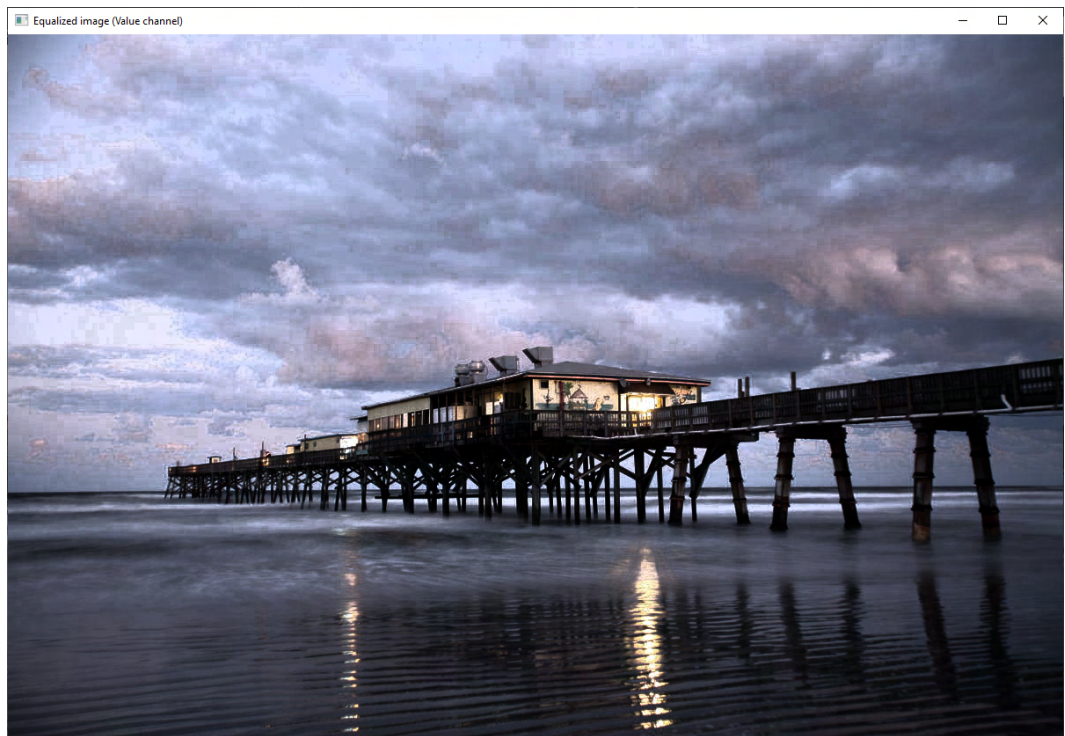


Figure 3: Part 3

