Assignment #1

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CS4187: Computer Vision for Interactivity

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I.   Explain solution to question 1.1

The intensity of each color channel in the background image is separated with the use of <Vec3b> and indexing it at 0, 1, and 2. Index at 0 represents the blue channel, index at 1 represents the green channel, and 2 represents the red channel. Through experimentation, I determined which intensity resulted in the best removal of the background without the removal of the man as well. Then, looping through the columns and rows, if the pixels are a part of the green screen, the pixels are replaced with the background.

II.   Explain solution to question 1.3 and what went wrong

I was not able to correctly implement 1.3, however I was able to partially implement it. I was able to make a program which has an adjustable brush size which when it is used, it reveals the background; however, it will also remove the man. I tried to put the code after checking for the green color, similar to what was done for 1.1, as well as many other variations, however this did not work, and usually led to my computer or the program freezing. This is most likely due to the excessive nested loops. Additionally, I was not able to determine which pixels were being "painted". If I had more time, I would try to store all background pixels in an matrix as either 0

or 255 if they are green, and check if the pixel that was trying to be painted was apart of that array.

  III.   Solution for Box, Gaussian, and Media filter

For each of the required filters, I made a separate project which includes one image which is not commented out, and another which is. For each image, cv::Filter (Filter is either boxFilter, GaussianBlur, or medianBlur) is used to filter the image, and cv::Size is used to vary the kernel size between 3, 5, 7, 9, 11 or for the Gassian, 4, 5, 6, 7, 8, 9, 10. Then each image is drawn.

  IV.   Find the best filters for each image accordingly, and explain why.

For the image of Lena, the best filter appears to be the box filter with kernel size 11. The Lena filter has the noise type of gaussian noise, which is best dealt with via the gaussian filter. The gaussian filter did not change the appearance of the image much, however this filter could possibly also be a good option as the gaussian filter creates more of a smooth appearance and preserves edges better, whereas the box filter has some streaks in its filter. The details also are not preserved very well, which is what the box filter does, however the noise is removed. Due to the fact that the gaussian filter was being tested with the variant, the box filter was best for this image.

As for the circuit image, the best filter appears to be the median filter with a kernel size of 7. This is because the circuit image has salt-and-pepper noise, which is best removed using the median filter.