Assignment 2

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Problem 1)

a.

For image 1 we want to make it more detailed, in other words we want to separate every two neighbor colors in the image by making these two colors as far as possible in the histogram. So, the brightness and contrast will not help a lot because it makes the same changes to all the pixels, and the gamma correction will also make the image brighter/ darker in specific places so it also won't help us, but when using the Histogram equalization will affect all the pixels in a way that the dark pixels will be darker and the bright pixels will be brighter.

For image 2 we want to make the shadows brighter, that means the already dark places we want to make them brighter by moving the dark colors up towards the middle (~255/2), so using histogram equalization won't help us cause it will make the dark pixels darker and the bright ones brighter and when changing the brightness and contrast stretching method won't help either because increasing the contrast will also make the deference between the colors grater and then the dark even darker, also when decrease the contrast will make the image colors like each other and they are already gathered in the dark side so it won't help, but using gamma correction will change the dark areas a lot and the already bright ones a little so by decrease it will make our goal.

For image 3 we want to make the bright sky a little darker without changing the rest of the image a lot so histogram equalization won't help because it will make the dark pixels darker and the bright ones brighter so it will ruin the already good parts of the image, in the same way using gamma correction will make the dark pixels brighter and when increase the gamma to make the bright pixels darker will also effect the dark ones to be darker, but when decreasing the contrast will make the color of the whole pixels closer to each other so it will make the bright ones a lot darker and then to fix the dark areas which now brighter we will decrease the brightness and it will fix it.

b.

image 1: we used Histogram equalization as we explained in (a) to make the image more detailed.

image 2: we used gamma correction to make the shadows brighter so we should use γ <1, after we tried, we found that γ= 0.6 a good option.

Image 3: as explained previously in (a) we decreased the contrast by choosing the “a” to be equal to 0.8 and the brightness by choosing the “b” to be equal to -15 after we tried some other values.

Problem 2)

In “get_transform” in order to transform the image when we need affine transformation we used “cv2.estimateAffine2D” and when we wanted homographic transformation we used “cv2.findHomography” to get the transformation matrix, In the stitch part we made a mask of the colored pixels in the second picture and replaced those pixels on the first image and finally when we wanted to transform we used cv2.warpAffine and cv2.warpPerspective.