

Computer Vision Homework 1

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Overview

The aim of this is to make a start point to the image processing basics.

Through the homework we were required to use OpenCV, NumPy and MoviePy libraries.

Given tasks consist of reading images, process those images and return the processed images as videos.

Part 1: Dancing Alone

In this introductory problem we were required to obtain given cat pictures as a video.

The cat frames has green screen behind, therefore the green screen has to be removed before placing the cat images onto the background image.

I used the codes given us and successfully saved the cat images as a video.



Part 2: Dancing with myself

To get a mirror image of the left side cat I flipped the cat image first. Since the background image is wider than the cat images, to place the flipped cat images onto the right corner of the background image I created a bright green padding having exact height with the background image and, the width of the difference of the background image and a cat image. Then I attached the green padding to the left side of the flipped cat image. I layered both the raw cat images and the padded-flipped cat images on the background image. I successfully obtained dancing cats video.



Part 3: Dancing with my shadow

To make the right cats darker, I used cv2.subtract(). To make the subtraction I have to create an array of ones,



having same shape at the cat images and by multiplying the total array with a constant value I was able to subtract that constant value from every pixels at each channel. As the constant value increases the image gets darker.

Decreased with a constant value 90



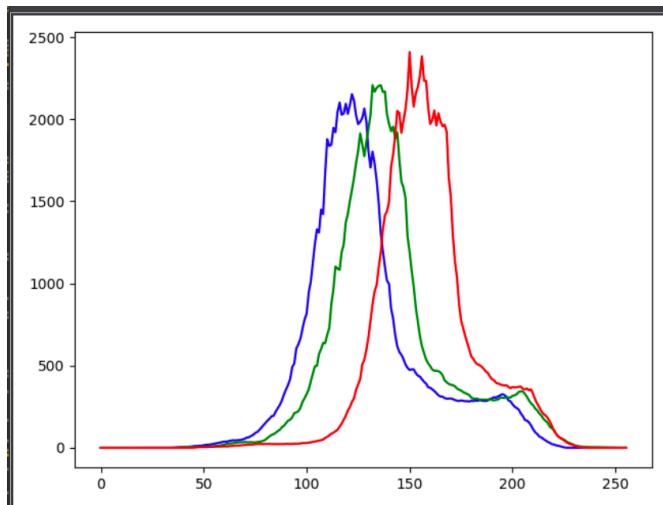
Decreased with constant value 150

Part 3 & 4

For the last two parts I believe green screen removals does not work very well as it can be seen from the below figure right side cat has some noises around edges. Even I believe that my histogram matching works fine green screen removals create some problems for me.



The histogram plot for the average foreground cat histograms is below.



To talk about how I implemented histogram matching I have two different histogram functions one is normal images and one is for green screen images. The histogram for the green screen images takes nonzero values and calculates histogram accordingly.

For the Part 3 I calculate the average of the all left side foreground histograms. Part 4 calculates histogram for every frame and adds noise to the each calculated histograms

I have also created a method for calculating CDFs by give histogram as a parameter.

I generate a look up table from two given CDFs. Lastly I apply the look-up-table to the image that I want to change its properties.

Lastly these are result images from my dancing disco cats from the last part.

