

CSCI-631: Foundations of Computer Vision

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HOMEWORK - 2

Ans 1)

Image	Task To perform	Best Color Channel to use for the task. What contrast did you measure?
ANPR_IMG_2387.jpg	Telling the license plate from car color	RGB (Green Channel) License plate becomes dark and background is light because we are extracting green color channel and car is green in color. In question it is asked to detect just license plate, but if we have to detect <u>plate number</u> the LAB (Third channel) is the best.
Macbeth_7457.jpg	Telling the red square from black square	RGB (Red channel) Black becomes more dark and red box is brighter than black
Michelle_Carter_first_us_shot_put_gold_winner_2016__credit_Alexander_Hassenstein_via_Getty_Images_2016.jpg	Detecting the name "CARTER" against the white background.	HSV (Saturation) White background becomes black and the name is highlighted in brighter color
TBK_Kite.jpg	Telling the red patch of the kite from the background sky.	Lab (Second Channel) Red patch in the kite is brighter than the sky.
peppers.png (matlab image)	Detecting the yellow pepper from the other objects.	Lab (Third Channel) Yellow paper is brightest among other objects in the picture.

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Ans 2)

Image Name	Average Value(3 Digits)	Standard Deviation(3 Digits)	Notes & Observation, If any:
GRAY_GC01_7334	0.494	0.019	1) Looking at histogram and value of mean, this picture has more pixel density in range close to value 0.5 which gives us lighter shade of gray compare to others.
GRAY_GC02_7354	0.374	0.019	1) Looking at histogram and value of mean, this picture has more pixel density in range 0.35 to 0.4 which gives us darker shade of gray compare to first image.
GRAY_GC04_7370	0.350	0.017	1) Pixels are evenly distributed in range 0.33 to 0.38(approx.) and hence the mean is 0.35 and gray color is littler bit darker than the other images.
GRAY_GC04_7371	0.353	0.017	This image looks similar to the image GRAY_GC04_7370.jpg.
GRAY_GC04_7372	0.356	0.023	1) Even though the mean value for this image is 0.356 but the pixels are not uniformly distributed. There is a <i>break in histogram</i> . It has very few pixels in range 0.33 to 0.37(approx.) which resulted in more noise.
GRAY_GC10_20170208_104521	0.358	0.009	1) Image is very sharp and has very less noise.

Q 3) Write up any notes you learned over-all on this assignment. Do you have any reflections about the importance of the color to use? Do you notice anything else when comparing images of graycards? Did the colors differ? Did the cameras keep them the same?

Ans 3) There are so many things I have learnt in this assignment:

- First I have learnt how to use various color spaces to identify the desired object in the image.
- In second question, I learnt about how to use `ginput()` to select a part of picture and how to use histogram to analyze the value of the pixels distributed along the image. By doing this assignment.
- I got little idea about how to use various color spaces based on color of the object and the background.
- Yes, the color differs in graycard images. For a few graycard images we can see the color change. For others, there is a minor change in color that too I found while analyzing histogram and mean value.
- I have used 'imfinfo' command to file details of each graycard file. I found that first four images are taken from same camera "Canon-Canon PowerShot ELPH 150 IS". We don't have details for fifth image. While last image(sixth) is taken from "BLU-BLU STUDIO 5.0 C HD".
- No, the cameras did not keep all the images same. Lens in every camera captures different amount of light hence change in the pictures. Even picture taken from same camera can have slight differences based on amount of light captured while clicking a picture.