

Basic Image Processing

Link to the Images:

<https://drive.google.com/drive/folders/1QC910Yh70rkaUm9B3fLEJQRQMCbNkw9h?usp=sharing>

Ex 1

Read lena.png and print the dimensions.

Read chair.png and print the dimensions.

Verify if you are getting 4 channels in chair.png

Plot the mask of the chair in the image chair.png

Ex 2

Read lena.png in grayscale and shift the intensity values by 45 and visualize.

Ex 3

Write a program to read and plot histogram for a grayscale image.

Ex 4:

Perform simple thresholding on the image 'FingerPrint.jpg'. Plot the histogram and observe the threshold value. You can use an inbuilt function for thresholding.

Perform simple thresholding on the image 'sudoku.jpeg' in grayscale. Plot the histogram and observe the threshold value. You can use an inbuilt function for thresholding.

Ex 5:

Write a function which takes an image section and filter as an input and gives the convolution output. Take the filter to be- `np.array([[1,1,1],[1,1,1],[1,1,1]])/9`

Ex 6:

Count the number of windows in image 'window.jpeg' using edge detection filters.

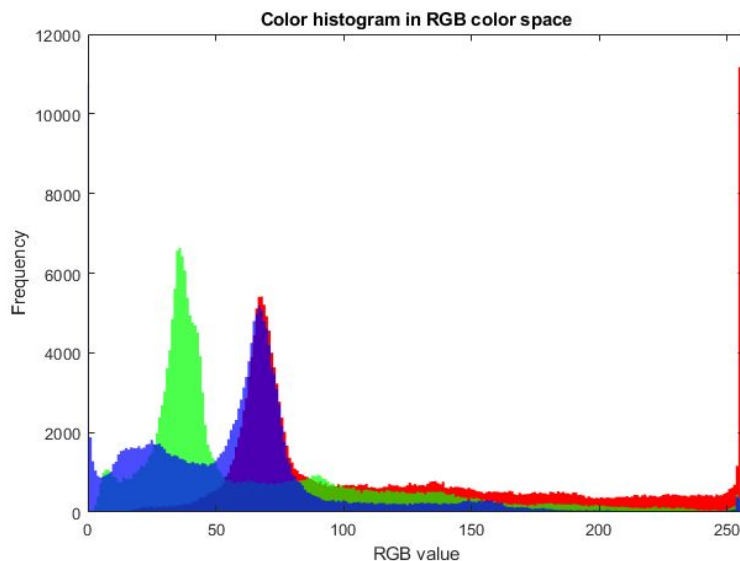
Questions to be done in notebook:

Q1 Plot histogram for RGB images 'lotus.jpg'. You can use inbuilt functions for that. All RGB channels should be plotted in the same curve. Create a function for this so that it can be used later also.

Q2 Perform gamma transformation on the images **gamma1.jpg** and **gamma2.jpg** and see which values of gamma give you better images. Use $C = 1$.

Q3 Perform thresholding on the image 'text.jpg'

Q4 Count the number of windows in image 'window.jpeg' using edge detection filters.



Day 3

Link to the Images:

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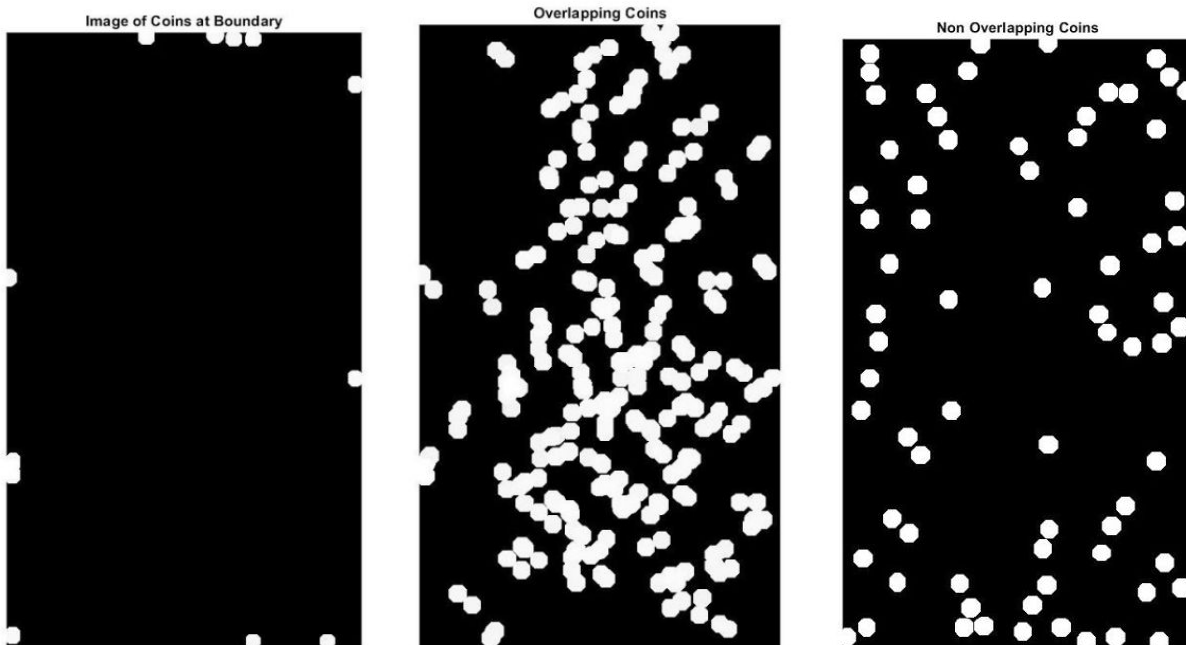
Questions to be done in notebook:

HW: Write a script which reads 'coin.jpg' as input and outputs a new image containing:
Also count the number of coins in each case.

only the coins touching the boundary of the image

only the coins which overlap with each other.

only non-overlapping coins.



HW: Read the image 'objects.png' and try to answer the following questions using code.
Identify means plot the following objects.

How many objects have one or more holes?

How many square objects are in the image?

Identify the square objects that have holes.

Identify the circular objects that have no holes

HW: Write a script which takes the image 'text2.png' as input and outputs the number of components for each of the five colors. Note that the components may be non-letters (e.g. . and |) Use thresholding and connected components to solve this. You can crop image for each colour manually.

HW: **Chroma Keying**: Perform chroma Keying on the images rose.jpeg and chroma_img.jpg on a suitable background. Experiment with different backgrounds and show some interesting results.

HW: **Face Alignment**: Read the image 'face.jpg' and rotate the image such that eyes are aligned with respect to the x axis. Then show only the face by taking coordinates from the user and scale to the same size.

HW: **Perspective Transformation**: Put the banner of coco-cola on the field. Experiment with these functions and show some interesting results.