What is computer vision?

Ans: Give the computer a vision power. Giving the ability to get recognize images and videos through a model or algorithm that is being used, is known of part of computer vision.

What is image processing?

Ans: For the computer vision tasks how we process our images: it can be segmentation, edge detection, or feature extraction. Before giving input to the computer vision model we have to go through those kind of tasks.

Why is image processing needed in Computer Vision?

Ans: To make introduce any object, first, we have to identify the object and then input the object to the computer vision model. Giving input to our computer vision model extracting information or features from visual representation image processing is mandatory.

What is an image?

Ans: A matrix of pixels.

How do we interpret an image vs how a computer interprets an image?

Ans: We interpret with color and computer interpret of pixels.

Image loading and showing with different libraries(matplotlib, PIL, openCV, Skimage)  
Loaded image in python array?

Matplotlib:

import matplotlib.pyplot as plt

image\_path = 'images/sunflower.jfif'

image = plt.imread(image\_path) # load image using matplotlib

plt.imshow(image)

PIL:

from PIL import Image

image\_path = 'images/sunflower.jfif'

image = Image.open(image\_path)

display(image)

OpenCV:

import cv2

image\_path = 'images/sunflower.jfif'

image = cv2.imread(image\_path)

cv2.imshow('sunflower', image)

cv2.waitKey(0)

cv2.destroyAllWindows()

Skimage:

import skimage

from skimage import io

img = io.imread('images/sunflower.jfif')

io.imshow(img)

io.show()

What is Channel in an image?

Ans: A channel is a grayscale image of a color image. Suppose you are working with blue channel, the image will be justified by white and black where, black means not blue and white means deep blue.

Splitting and Showing different channels using different libraries (matplotlib, PIL, openCV, Skimage) Multiple images plotting using matplotlib.

PILLow:

import numpy as np

import matplotlib.pyplot as plt

from PIL import Image

img = Image.open("images/sunflower.jfif")

M = np.asarray(img)

plt.figure(figsize=(10, 10))

plt.subplot(1,3, 1)

plt.imshow(M[:, :, 0], cmap='gray')

plt.title("Red Channel")

plt.subplot(1,3,2)

plt.imshow(M[:, :, 1], cmap='gray')

plt.title("Green Channel")

plt.subplot(1,3,3)

plt.imshow(M[:, :, 2], cmap='gray')

plt.title("Blue Channel")

plt.show()

OpenCV:

import cv2

image\_path = 'images/sunflower.jfif'

image = cv2.imread(image\_path)

blue, green, red = cv2.split(image)

rgb = cv2.cvtColor(image, cv2.COLOR\_BGR2RGB)

plt.subplot(2,2,1)

plt.imshow(rgb)

plt.subplot(2,2,2)

plt.imshow(blue, cmap='gray')

plt.subplot(2,2,3)

plt.imshow(green, cmap='gray')

plt.subplot(2,2,4)

plt.imshow(red, cmap='gray')

HW-1: show different channels of an image using at least one of these (Skimage, PIL, matplotlib)

PILLow:

import numpy as np

import matplotlib.pyplot as plt

from PIL import Image

img = Image.open("images/sunflower.jfif")

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plt.imshow(M[:, :, 0], cmap='gray')

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plt.subplot(1,3,2)

plt.imshow(M[:, :, 1], cmap='gray')

plt.title("Green Channel")

plt.subplot(1,3,3)

plt.imshow(M[:, :, 2], cmap='gray')

plt.title("Blue Channel")

plt.show()

OpenCV:

import cv2

image\_path = 'images/sunflower.jfif'

image = cv2.imread(image\_path)

blue, green, red = cv2.split(image)

rgb = cv2.cvtColor(image, cv2.COLOR\_BGR2RGB)

plt.subplot(2,2,1)

plt.imshow(rgb)

plt.subplot(2,2,2)

plt.imshow(blue, cmap='gray')

plt.subplot(2,2,3)

plt.imshow(green, cmap='gray')

plt.subplot(2,2,4)

plt.imshow(red, cmap='gray')

HW-2: Image loading and showing using at least one of these ( openCV, Skimage) Image loading and showing using at least one of these ( openCV, Skimage).

OpenCV:

import cv2

image\_path = 'images/sunflower.jfif'

image = cv2.imread(image\_path)

cv2.imshow('sunflower', image)

cv2.waitKey(0)

cv2.destroyAllWindows()

Skimage:

import skimage

from skimage import io

img = io.imread('images/sunflower.jfif')

io.imshow(img)

io.show()

HW-3: explain the reason of color difference when an image is loaded with openCV but plotted using matplotlib.

OpenCV follows the BGR color channel whereas matplotlib follows the RGB color channel, Red and Blue color swap that’s why the color difference is arisen.

Bonus-1: how the color channel mismatch can affect the our image processing tasks.

Ans: We may recognize or identify the wrong object, the data processing task may not be accurate.

Bonus-2: Plot three images in a single column using matplotlib.

import matplotlib.pyplot as plt

Mash\_image = plt.imread('images/mashrafee.jfif')

Shakib\_image = plt.imread('images/shakib.jfif')

Tamim\_image = plt.imread('images/tamim.jfif')

plt.subplot(1,3,1)

plt.imshow(Mash\_image)

plt.title("Mashrafee")

plt.subplot(1,3,2)

plt.imshow(Shakib\_image)

plt.title("Shakib\_image")

plt.subplot(1,3,3)

plt.imshow(Tamim\_image)

plt.title("Tamim\_image")