



OPENCV

BASICS

COMPUTER VISION

- Computer vision is the process of understanding digital images and videos using computers.
- It seeks to automate tasks that human vision can achieve.
- This involves methods of acquiring, processing, analyzing, and understanding digital images, and extraction of data from the real world to produce information.



It also has sub-domains such as object recognition, video tracking, and motion estimation, thus having applications in medicine, navigation, and object modeling.

“The goal of computer vision is to understand the content of digital images and videos.”

Libraries for computer vision

- Pytorch CV
- Open CV
- Keras



WHAT IS OPEN CV ?

OpenCV (Open Source Computer Vision Library) is an open source computer vision and machine learning software library. OpenCV was built to provide a common infrastructure for computer vision applications



OpenCV you access to a variety of image formats as well
OpenCV supports a wide variety of programming languages like Python, C++, Java, etc.

1 cv2.imread

The method imread, more commonly called as image read, in opencv is used for reading the images from a file path

Parameters: cv2.imread(filename,[flags])

In the above parameter you can see that the mandatory requirement is the filename which can be passed as a string. The filename is the image which you want to be read by the computer.

Flags	Comment
<0	returns loaded image with alpha channel
0	returns gray scale image
>0	returns 3 channel color image

cv2.IMREAD_UNCHANGED	This flag is used to return the loaded image as is (with alpha channel, otherwise it gets cropped). . Alternatively, we can pass integer value -1 for this flag.
cv2.IMREAD_GRAYSCALE	This flag is used to return the image in grayscale format. Alternatively, we can pass integer value 0 for this flag.
cv2.IMREAD_COLOR	This flag is used to return the image in BGR color format. It is the default flag. Alternatively, we can pass integer value 1 for this flag.
cv2.IMREAD_ANYDEPTH	This flag is used to return 16-bit/32-bit image when the input has the corresponding depth, otherwise convert it to 8-bit. Alternatively, we can pass integer value 2 for this flag.
cv2.IMREAD_ANYCOLOR	This flag is used to return the image in any possible color format. Alternatively, we can pass integer value 4 for this flag.
cv2.IMREAD_LOAD_GDAL	This flag is used the gdal driver for loading the image. Alternatively, we can pass integer value 8 for this flag.

cv2.IMREAD_REDUCED_GRAYSCALE_2	This flag is used to return the image in grayscale format and the image size reduced to 1/2 of the original image size .Alternatively, we can pass integer value 16 for this flag.
cv2.IMREAD_REDUCED_COLOR_2	This flag is used to return the image in BGR color format and the image size reduced to 1/2 of the original image size.Alternatively, we can pass integer value 17 for this flag.
cv2.IMREAD_REDUCED_GRAYSCALE_4	This flag is used to return the image in grayscale format and the image size reduced to 1/4 of the original image size .Alternatively, we can pass integer value 32 for this flag.
cv2.IMREAD_REDUCED_COLOR_4	This flag is used to return the image in BGR color format and the image size reduced to 1/4 of the original image size.Alternatively, we can pass integer value 33 for this flag.
cv2.IMREAD_REDUCED_GRAYSCALE_8	This flag is used to return the image in grayscale format and the image size reduced to 1/8 of the original image size .Alternatively, we can pass integer value 64 for this flag.
cv2.IMREAD_REDUCED_COLOR_8	This flag is used to return the image in BGR color format and the image size reduced to 1/8 of the original image size.Alternatively, we can pass integer value 65 for this flag.

- The syntax of `imread()` function contains a second argument whose default value is `cv2.IMREAD_COLOR`. Any transparency present in the image is not read.
- To read PNG images with transparency (alpha) channel, use `cv2.IMREAD_UNCHANGED` as second argument in `cv2.imread()` function as shown in the following.

2 cap.isOpened()

`cap` is the variable that contains the video. The above function returns true if the video is successfully opened else returns false.

3 cap.release()

The above function releases the video stored in `cap`

4. `cv2.imshow()`

As the name suggests this method is used for showing the images

Parameters: `cv2.imshow(window_name,image)`

The `window_name` should be a string value and hence will be enclosed in double or single quotes. The image shall be the image which should be

5. `cv2.waitKey()`

This function is very important, without this function `cv2.imshow()` won't work properly.

Parameters: `cv2.waitKey(wait time in milliseconds)`

Thus if the wait time is entered as 6000, the picture will be displayed for 6s and then get closed (provided you have `cv2.destroyAllWindows()` in the script). If you use '0' as the parameter then the image will be displayed for infinite time until you press the esc key.

6 cv2.cvtColor()

cvtColor can be interpreted as convert color and this method is used for converting the image from one color space to another color space

Example: cv2.cvtColor(img, cv2.COLOR_RGB2GRAY)

7 cv2.destroyAllWindows()

This method destroys (in other words “closes”) all the windows created using the opencv methods. If you want to close a specific window, then you can pass the window name as the argument within this function. The cleanup is done automatically. This function useful in a called routine to setup environment and release unneeded resources for any processing that follows.