Bansilal Ramnath Agarwal Charitable Trust's

Vishwakarma Institute of Information Technology

Department of Artificial Intelligence and Data Science

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Class: TY	Division: B	Roll No: 372028
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Subject Name & Code: Image Processing: ADUA31205(B)		
Title of Assignment: Set up different image processing libraries in Python. Perform basic image manipulations (resizing, cropping, negating) and transformations (linear, affine transformations)		
Date of Performance: 08-08-2023	Date of Submission: 15-08-2023	

ASSIGNMENT NO. 1

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IP Assignment no. 1

Title : Set up different image processing libraries in Python perform basic image manipulation & transformation.

Learning Objective :

1) To learn about 'opencv' library in python.
2) To learn basic commands for image processing in opencv.
3) To perform basic image manipulation such as
   i) Resizing
   ii) Cropping
   iii) Negating
4) To perform basic transformation such as : →
   i) linear transformation
   ii) To learn different concept of image processing
5) To learn different concept of image processing.

Theory :→

* **OpenCv :** It is an open compute vision and machine learning software library. It was built to provide a common infrastructure for computer vision app and to accelerate use of machine perception in the commercial product. The library has more than 2500 optimized algorithm, which include a comprehensive set of both classic and state of the art computer vision and machine learning algorithms.

  It has more than 47 thousand people of user community and estimated no of downloads exceeding 18 million. The library is used extensively in companies, research group & by governmental bodies.

* **Image Manipulation :** → It refer to the transforming of image to arrive at a desired output.

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i) Resizing : It allows you to make your image smaller or larger without cutting anything out.
ii) Cropping : It is improving an image by removing unnecessary part.
iii) Negating : Negating is an image, usually on a strip of plastic film where lightest areas appear dark & vice versa.

* Image transformation :

An image transform can be applied to an image to convert it form one domain to another.

i) Linear transformation : Piece wise linear transformation is type of gray level transformation that is used for image enhancement.
ii) Affine : It is a linear mapping method that preserves points, straight line & planes.

Conclusion :→

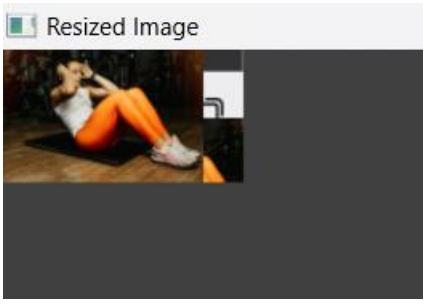
Thus, we successfully performed basic image manipulation like resizing, cropping & negating & basic image transformation like linear & affine transformation using opencv.

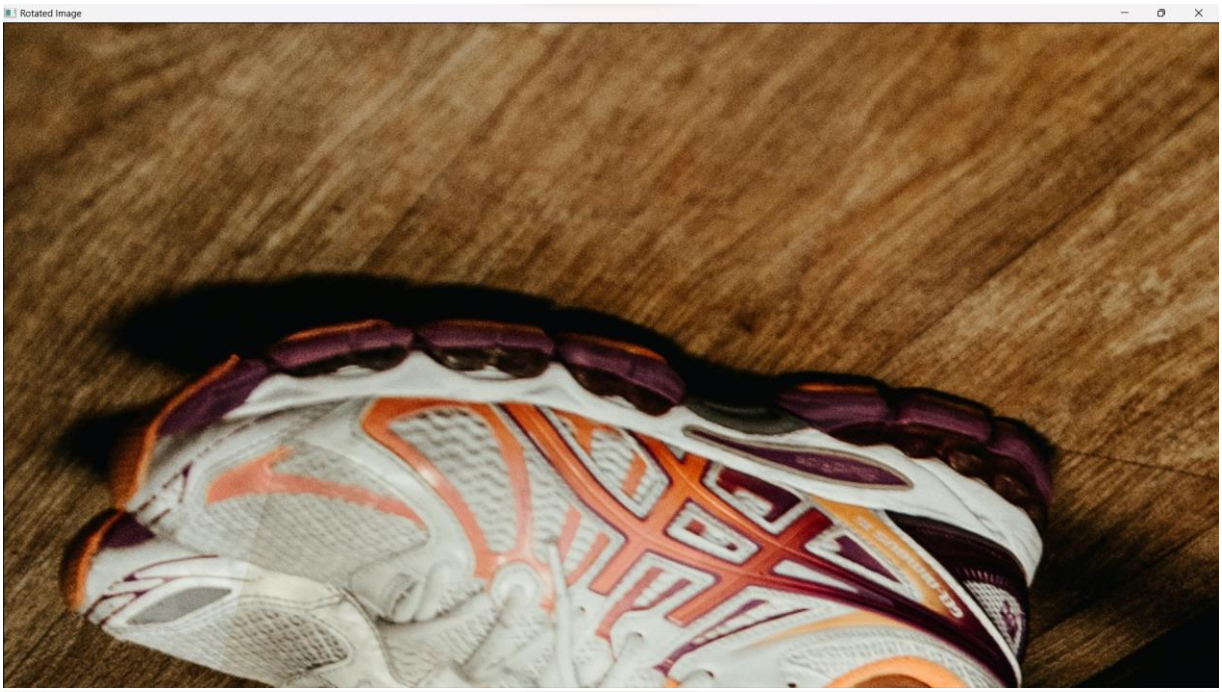
Software requirement :→ Vs code

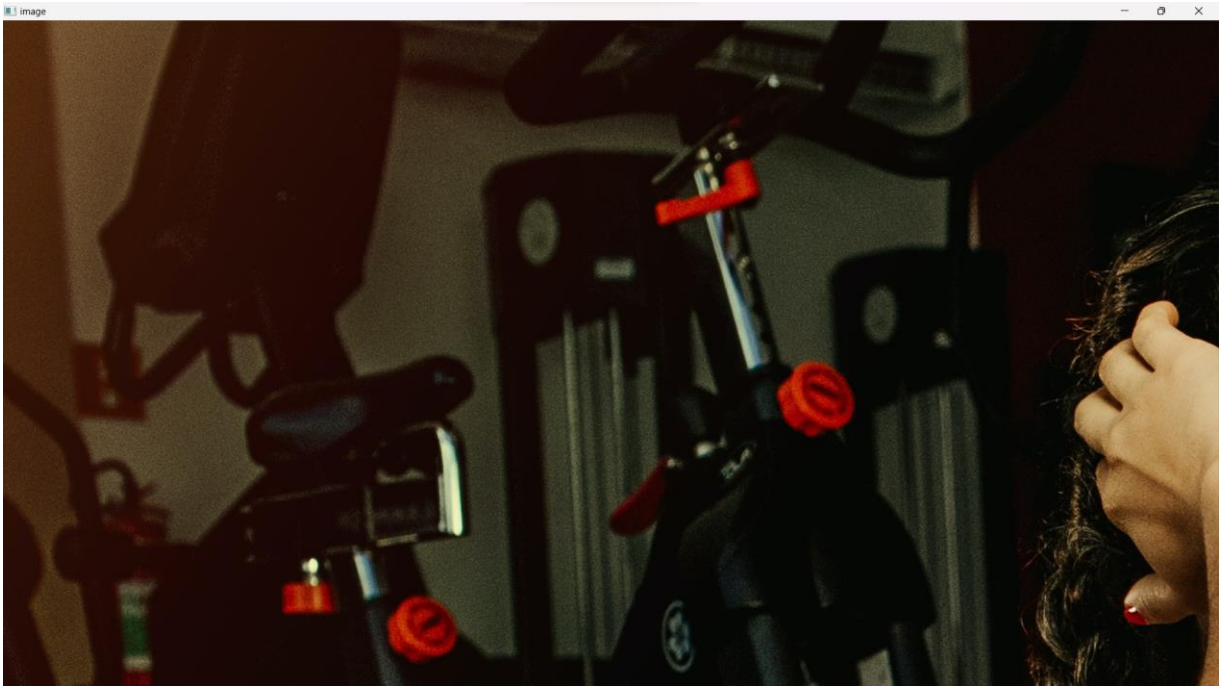
Program Code:

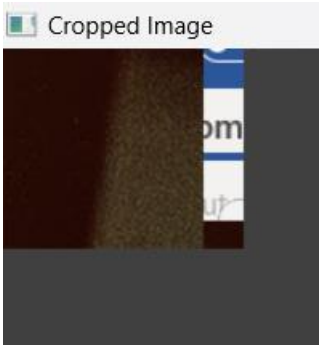
```
# 1.Loading and Displaying an Image

# import the necessary packages  import
cv2
# load the image and show it
image = cv2.imread("D:\MY FILES\wallpaper\BLACK HOLE.jpg")
window_name = 'image'
cv2.imshow(window_name, image)

# print the dimensions of the image  print(image.shape)

# 2. Resizing an Image using Python and OpenCV

# we need to keep in mind aspect ratio so the image does #
not look skewed or distorted -- therefore, we calculate
# the ratio of the new image to the old image
r = 100.0 / image.shape[1]
dim = (100, int(image.shape[0] * r))
# perform the actual resizing of the image and show it  resized
= cv2.resize(image, dim, interpolation = cv2.INTER_AREA)
cv2.imshow("resized", resized)

# 3. Rotating an Image using Python and OpenCV
# finding centre
(h, w) = image.shape[:2] center
= (w / 2, h / 2)
# rotate the image by 180 degrees
M = cv2.getRotationMatrix2D(center, 180, 1.0) rotated
= cv2.warpAffine(image, M, (w, h))
cv2.imshow("rotated", rotated)

# 4. Cropping an Image using Python and OpenCV

# crop the image using array slices cropped
= image[70:170, 440:540]
cv2.imshow("cropped", cropped)
cv2.waitKey(0)
```

Output:








Cropped Image