DSA0204 – COMPUTER VISION WITH OPEN CV

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Q1.

AIM:

To Perform basic Image Handling and processing operations on the image. Read an image in python and Convert an Image to Grayscale

SOURCE CODE:

```
import cv2

image_path = "C:/Users/kosur/Pictures/cv/yellowcar.jpeg"

image = cv2.imread(image_path)

gray_image = cv2.cvtColor(image, cv2.COLOR_BGR2GRAY)

cv2.imshow('Original Image', image)

cv2.imshow('Grayscale Image', gray_image)

cv2.waitKey(0)

cv2.destroyAllWindows()
```

INPUT:

OUTPUT:

Q2.

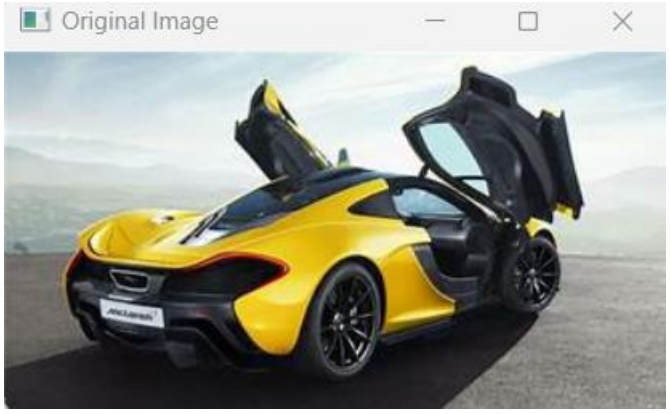
AIM:

To perform basic Image Handling and processing operations on the image.Read an image in python and Convert an Image to Blur using GaussianBlur.

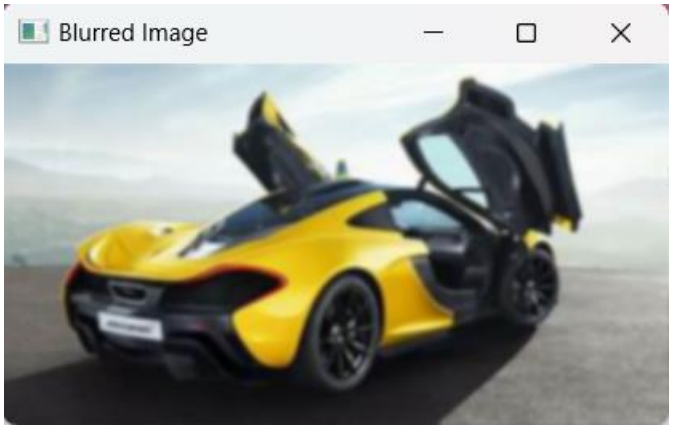
SOURCE CODE:

```
import cv2

image_path = "C:/Users/kosur/Pictures/cv/yellowcar.jpeg"

image = cv2.imread(image_path)

blurred_image = cv2.GaussianBlur(image, (5, 5), 0)

cv2.imshow('Original Image', image)

cv2.imshow('Blurred Image', blurred_image)

cv2.waitKey(0)

cv2.destroyAllWindows()
```

INPUT:



OUTPUT:



Q3.

AIM:

To perform Basic Operations to Convert image to show outline Canny function.

SOURCE CODE:

```
import cv2
import numpy as np
kernel = np.ones((5,5),np.uint8)
print(kernel)
path = "C:/Users/kosur/Pictures/cv/yellowcar.jpeg"
img =cv2.imread(path)
imgGray = cv2.cvtColor(img,cv2.COLOR_BGR2GRAY)
imgBlur = cv2.GaussianBlur(imgGray,(7,7),0)
imgCanny = cv2.Canny(imgBlur,100,200)
desired_width = 800
```

```
desired_height = 600
img_resized = cv2.resize(imgCanny, (desired_width, desired_height))
cv2.imshow("Img Canny",img_resized)
cv2.waitKey(0)
```

INPUT:

OUTPUT:

Q4.

AIM:

To perform basic Image Handling and processing operations on the image Read an image in python and Dilate an Image using Dilate function

SOURCE CODE:

```
import cv2
import numpy as np
kernel = np.ones((5,5),np.uint8)
print(kernel)
```

```
path = "C:/Users/kosur/Pictures/cv/yellowcar.jpeg"
img =cv2.imread(path)
imgGray = cv2.cvtColor(img,cv2.COLOR_BGR2GRAY)
imgBlur = cv2.GaussianBlur(imgGray,(7,7),0)
imgCanny = cv2.Canny(imgBlur,100,200)
ImgDilation = cv2.dilate(imgCanny,kernel , iterations = 10)
cv2.imshow("Img dILATION",ImgDilation)
cv2.waitKey(0)
```

INPUT:

OUTPUT:

Q5.

AIM:

To Perform basic Image Handling and processing operations on the image Read an image in python and Erode an Image using erode function

SOURCE CODE:

```
import cv2

import cv2

import numpy as np

kernel = np.ones((5,5),np.uint8)

print(kernel)

path = "C:/Users/kosur/Pictures/cv/yellowcar.jpeg"

img =cv2.imread(path)

imgGray = cv2.cvtColor(img,cv2.COLOR_BGR2GRAY)

imgBlur = cv2.GaussianBlur(imgGray,(7,7),0)

imgCanny = cv2.Canny(imgBlur,100,200)

imgDilation = cv2.dilate(imgCanny,kernel , iterations = 10)

imgEroded = cv2.erode(imgDilation,kernel,iterations=2)

desired_width = 800

desired_height = 600

img_resized = cv2.resize(imgEroded, (desired_width, desired_height))

cv2.imshow("Img Erosion",img_resized)

cv2.waitKey(0)
```

INPUT:

OUTPUT:

Q6.

AIM:

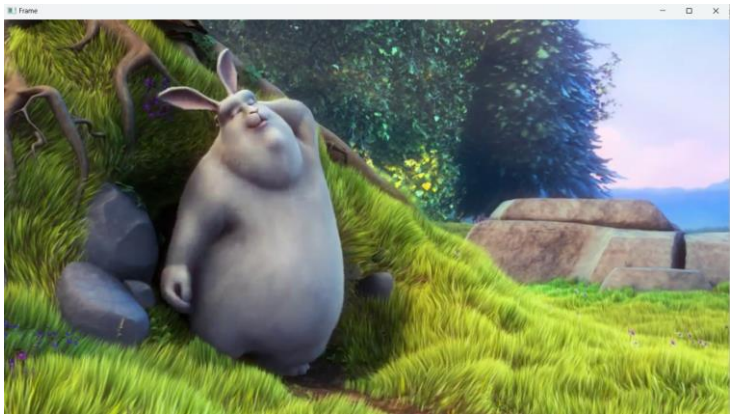
Perform basic video processing operations on the captured video• Read captured video in python and display the video, in slow motion and in fast motion.

SOURCE CODE:

import cv2

```
import cv2
import numpy as np
cap = cv2.VideoCapture("C://Users//ASHIK C SABU//Desktop//supraaa//car.mp4")
if (cap.isOpened()== False):
   print("Error opening video file")
while(cap.isOpened()):
   ret, frame = cap.read()
   if ret == True:
      cv2.imshow('Frame', frame)
      if cv2.waitKey(250) & 0xFF == ord('q'):
         break
   else:
      break
cap.release()
cv2.destroyAllWindows()
```

OUTPUT:



Q7.

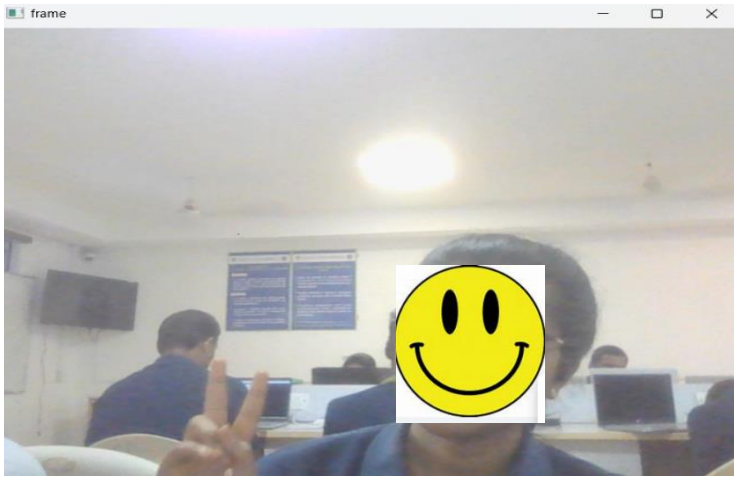
AIM:

Capture video from web Camera and Display the video, in slow motion and in fast motion operations on the captured video.

SOURCE CODE:

```
import cv2

cap = cv2.VideoCapture(0)

height = int(cap.get(cv2.CAP_PROP_FRAME_HEIGHT))

width = int(cap.get(cv2.CAP_PROP_FRAME_WIDTH))

fps = cap.get(cv2.CAP_PROP_FPS)

path = "0"

fourcc = cv2.VideoWriter_fourcc(*'mp4v')

output = cv2.VideoWriter(path, fourcc, 2,(width, height))

while True:
    ret, frame = cap.read()
    cv2.imshow("frame", frame)
    output.write(frame)
    k = cv2.waitKey(24)
    if k == ord("q"):
        break
cap.release()

output.release()

cv2.destroyAllWindows()
```

OUTPUT:



Q8.

AIM:

To perform Scaling an image to its Bigger and Smaller sizes

SOURCE CODE:

```
import cv2

import numpy as np

kernel = np.ones((5,5),np.uint8)

img = cv2.imread("C:/Users/kosur/Pictures/cv/yellowcar.jpeg",cv2.IMREAD_COLOR)

img = cv2.resize(img,(600,600))

cv2.imshow("image",img)

cv2.waitKey(0)
```

OUTPUT:

Q9.

AIM:

Perform Rotation of an image to clockwise and counter clockwise direction.

SOURCE CODE:

```
import cv2

path ="C:/Users/kosur/Pictures/cv/yellowcar.jpeg"

src = cv2.imread(path)

window_name = 'Image'

image = cv2.rotate(src, cv2.ROTATE_180)

img = cv2.resize(image,(600,600))

cv2.imshow(window_name, img)

cv2.waitKey(0)
```

OUTPUT:

Q10.

AIM:

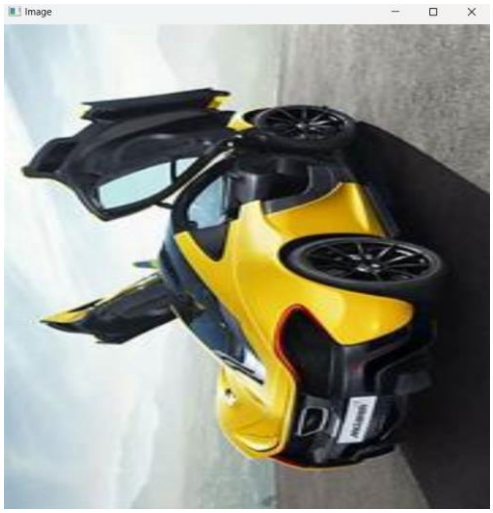
The Aim of the Experiment is to perform Rotation of an image along 90 degree.

SOURCE CODE:

```
import cv2

path ="C:/Users/kosur/Pictures/cv/yellowcar.jpeg"

src = cv2.imread(path)
```

```
window_name = 'Image'
image = cv2.rotate(src, cv2.ROTATE_90_COUNTERCLOCKWISE)
img = cv2.resize(image,(600,600))
cv2.imshow(window_name, img)
cv2.waitKey(0)
```

OUTPUT:



Q11.

AIM:

Perform Affine Transformation on the image.

SOURCE CODE:

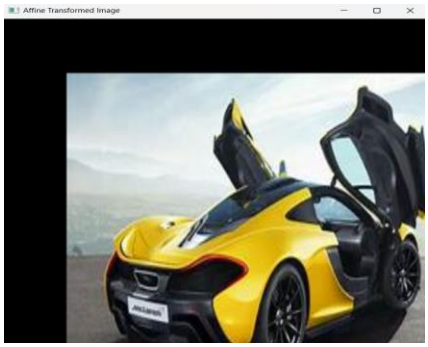
```
import cv2
import numpy as np
image_path = "C:/Users/kosur/Pictures/cv/yellowcar.jpeg"
image = cv2.imread(image_path)
rows, cols, _ = image.shape
transformation_matrix = np.float32([[1, 0, 50], [0, 1, 30]])
affine_image = cv2.warpAffine(image, transformation_matrix, (cols, rows))
img = cv2.resize(image,(600,600))
img2 = cv2.resize(affine_image,(600,600))
cv2.imshow('Original Image', img)
```

cv2.imshow('Affine Transformed Image', img2)

cv2.waitKey(0)

cv2.destroyAllWindows()**INPUT:**

OUTPUT:



Q12.

AIM:

Perform Perspective Transformation on the image.

SOURCE CODE:

```
import cv2

import numpy as np

img = cv2.imread("C:/Users/kosur/Pictures/cv/yellowcar.jpeg")

rows,cols,ch = img.shape

pts1 = np.float32([[56,65],[368,52],[28,387],[389,390]])

pts2 = np.float32([[100,50],[300,0],[0,300],[300,300]])

M = cv2.getPerspectiveTransform(pts1,pts2)

dst = cv2.warpPerspective(img,M,(cols, rows))

cv2.imshow('Transformed Image', dst)
```

```
cv2.waitKey(0)

cv2.destroyAllWindows()
```

OUTPUT:

Q13.

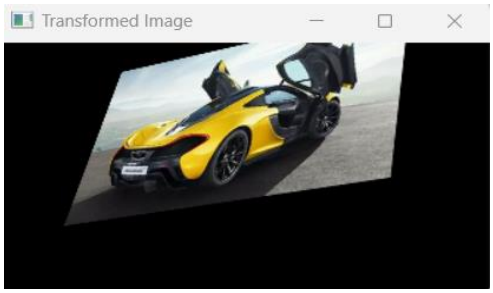
AIM:

Perform Perspective Transformation on the image.

SOURCE CODE:

```
import cv2

import numpy as np

img = cv2.imread("C:/Users/kosur/Pictures/cv/yellowcar.jpeg")

rows,cols,ch = img.shape

pts1 = np.float32([[56,65],[368,52],[28,387],[389,390]])

pts2 = np.float32([[100,50],[300,0],[0,300],[300,300]])

M = cv2.getPerspectiveTransform(pts1,pts2)

dst = cv2.warpPerspective(img,M,(cols, rows))

cv2.imshow('Transformed Image', dst)

cv2.waitKey(0)

cv2.destroyAllWindows()
```

OUTPUT:



Q14.

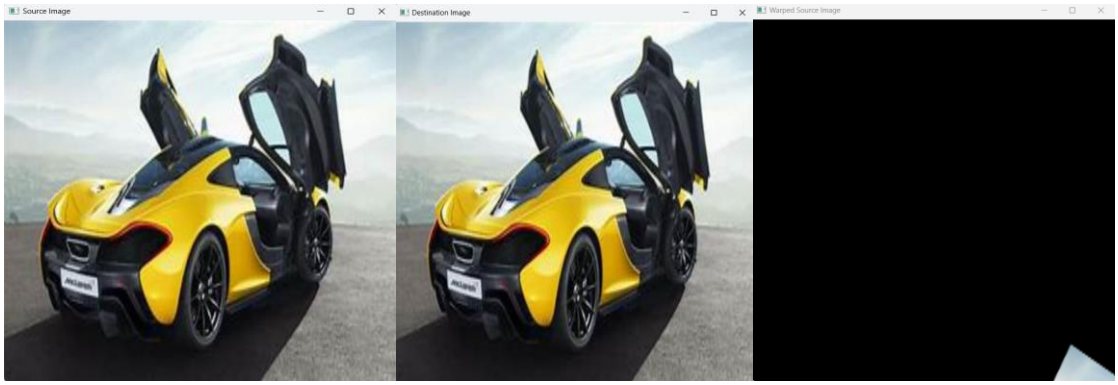
AIM:

Perform transformation using Homography matrix.

SOURCE CODE:

```
import cv2
import numpy as np
im_src = cv2.imread("C:/Users/kosur/Pictures/cv/yellowcar.jpeg")
pts_src = np.array([[141, 131], [480, 159], [493, 630],[64, 601]])
im_dst = cv2.imread("C:/Users/kosur/Pictures/cv/yellowcar.jpeg")
pts_dst = np.array([[318, 256],[534, 372],[316, 670],[73, 473]])
h, status = cv2.findHomography(pts_src, pts_dst)
im_out = cv2.warpPerspective(im_src, h, (im_dst.shape[1],im_dst.shape[0]))
img = cv2.resize(im_src,(600,600))
img1 = cv2.resize(im_dst,(600,600))
img2 = cv2.resize(im_out,(600,600))
cv2.imshow("Source Image", img)
cv2.imshow("Destination Image", img1)
cv2.imshow("Warped Source Image", img2)
cv2.waitKey(0)
cv2.destroyAllWindows()
```

OUTPUT:



Q15.

AIM:

Perform transformation using Direct Linear Transformation.

SOURCE CODE:

```
import cv2
import numpy as np
img1 = cv2.imread("C:/Users/kosur/pictures/cv/yellowcar.jpeg")
img2 = cv2.imread("C:/Users/kosur/pictures/cv/yellowcar.jpeg")
pts1 = np.array([[50, 50], [200, 50], [50, 200], [200, 200]])
pts2 = np.array([[100, 100], [300, 100], [100, 300], [300, 300]])
H, _ = cv2.findHomography(pts1, pts2)
dst = cv2.warpPerspective(img1, H, (img2.shape[1], img2.shape[0]))
img = cv2.resize(img1,(600,600))
img3 = cv2.resize(img2,(600,600))
img4 = cv2.resize(dst,(600,600))
cv2.imshow('img1', img)
cv2.imshow('img2', img3)
cv2.imshow('dst', img4)
cv2.waitKey(0)
cv2.destroyAllWindows()
```

OUTPUT:

Q16.

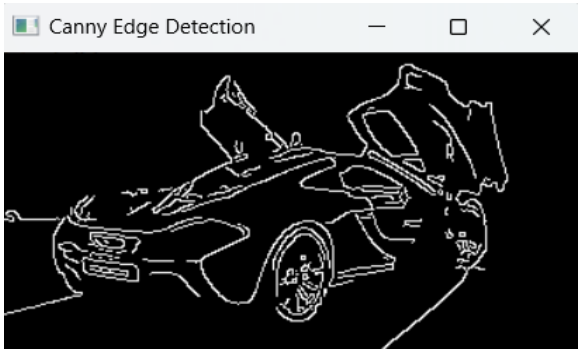
AIM:

Perform Edge detection using canny method

SOURCE CODE:

```
import cv2
img = cv2.imread("C:/Users/kosur/Pictures/cv/yellowcar.jpeg")
cv2.imshow('Original', img)
cv2.waitKey(0)
img_gray = cv2.cvtColor(img, cv2.COLOR_BGR2GRAY)
img_blur = cv2.GaussianBlur(img_gray, (3,3), 0)
edges = cv2.Canny(image=img_blur, threshold1=100, threshold2=200)
cv2.imshow('Canny Edge Detection', edges)
cv2.waitKey(0)
cv2.destroyAllWindows()
```

OUTPUT:



Q17.

AIM:

Perform Edge detection using Sobel Matrix along X axis

SOURCE CODE:

```
import cv2
img = cv2.imread("C:/Users/kosur/Pictures/cv/yellowcar.jpeg")
cv2.imshow('Original', img)
cv2.waitKey(0)
img_gray = cv2.cvtColor(img, cv2.COLOR_BGR2GRAY)
img_blur = cv2.GaussianBlur(img_gray, (3,3), 0)
sobelx = cv2.Sobel(src=img_blur, ddepth=cv2.CV_64F, dx=1, dy=0, ksize=5)
cv2.imshow('Sobel X', sobelx)
cv2.waitKey(0)
```

OUTPUT:

Q18 .

AIM:

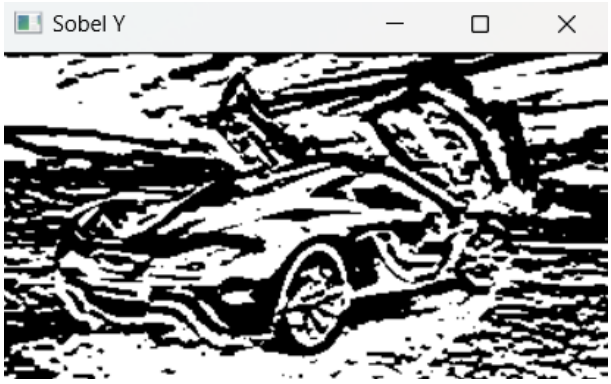
Perform Edge detection using Sobel Matrix along Y axis

SOURCE CODE:

```
import cv2
```

```
img = cv2.imread("C:/Users/kosur/Pictures/cv/yellowcar.jpeg")
cv2.imshow('Original', img)
cv2.waitKey(0)
img_gray = cv2.cvtColor(img, cv2.COLOR_BGR2GRAY)
img_blur = cv2.GaussianBlur(img_gray, (3,3), 0)
sobely = cv2.Sobel(src=img_blur, ddepth=cv2.CV_64F, dx=0, dy=1, ksize=5)
cv2.imshow('Sobel Y', sobely)
cv2.waitKey(0)
```

OUTPUT:



Q19.

AIM:

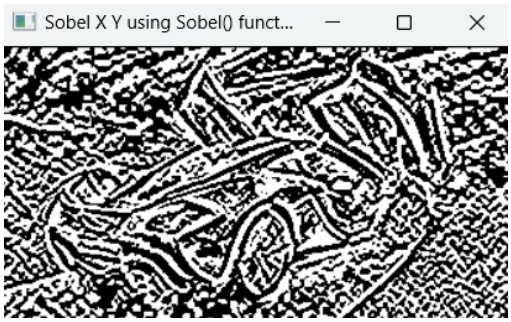
Perform Edge detection using Sobel Matrix along XY axis

SOURCE CODE:

```
import cv2
img = cv2.imread("C:/Users/kosur/Pictures/cv/yellowcar.jpeg")
cv2.imshow('Original', img)
cv2.waitKey(0)
img_gray = cv2.cvtColor(img, cv2.COLOR_BGR2GRAY)
img_blur = cv2.GaussianBlur(img_gray, (3,3), 0)
sobelxy = cv2.Sobel(src=img_blur, ddepth=cv2.CV_64F, dx=1, dy=1, ksize=5)
cv2.imshow('Sobel X Y using Sobel() function', sobelxy)
```

cv2.waitKey(0)

OUTPUT:



Q20.

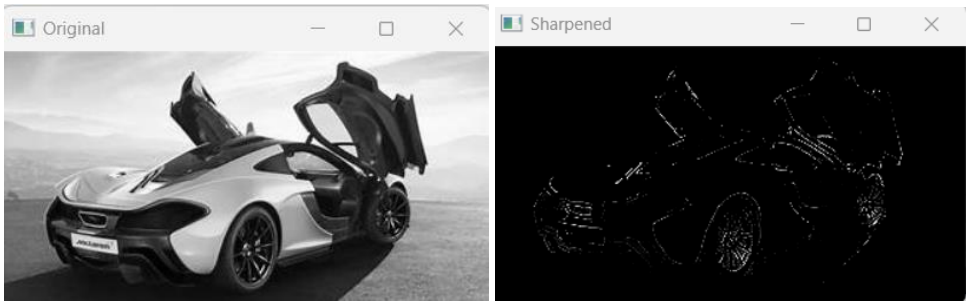
AIM:

Perform Sharpening of Image using Laplacian mask with negative center coefficient.

SOURCE CODE:

```
import cv2
import numpy as np
img = cv2.imread("C:/Users/kosur/Pictures/cv/yellowcar.jpeg")
gray = cv2.cvtColor(img, cv2.COLOR_BGR2GRAY)
kernel = np.array([[0,1,0], [1,-8,1], [0,1,0]])
sharpened = cv2.filter2D(gray, -1, kernel)
cv2.imshow('Original', gray)
cv2.imshow('Sharpened', sharpened)
cv2.waitKey(0)
cv2.destroyAllWindows()
```

OUTPUT:



Q21.

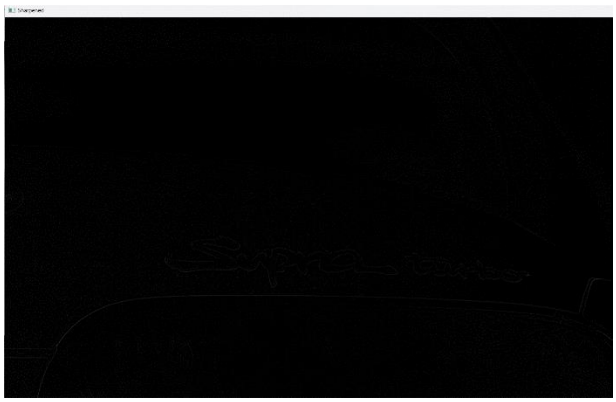
AIM:

Perform Sharpening of Image using Laplacian mask implemented with an extension of diagonal neighbors

SOURCE CODE:

```
import cv2
import numpy as np
img = cv2.imread("C:/Users/kosur/Pictures/cv/yellowcar.jpeg")
gray = cv2.cvtColor(img, cv2.COLOR_BGR2GRAY)
kernel = np.array([[0,1,0], [1,-4,1], [0,1,0]])
sharpened = cv2.filter2D(gray, -1, kernel)
cv2.imshow('Original', gray)
cv2.imshow('Sharpened', sharpened)
cv2.waitKey(0)
cv2.destroyAllWindows()
```

OUTPUT:



Q22.

AIM:

Perform Sharpening of Image using Laplacian mask with positive center coefficient.

SOURCE CODE:

```
import cv2
import numpy as np
img = cv2.imread("C:/Users/kosur/Pictures/cv/yellowcar.jpeg")
img = cv2.resize(img,(255, 255))
gray_img = cv2.cvtColor(img, cv2.COLOR_BGR2GRAY)
laplacian_kernel = np.array([[0, -1, 0], [-1, 5, -1], [0, -1, 0]])
sharpened_img = cv2.filter2D(gray_img, -1, laplacian_kernel)
sharpened_img = cv2.cvtColor(sharpened_img, cv2.COLOR_GRAY2BGR)
cv2.imshow('Original Image', img)
cv2.imshow('Sharpened Image', sharpened_img)
cv2.waitKey(0)
cv2.destroyAllWindows()
```

OUTPUT:

Q23.

AIM:

Perform Sharpening of Image using unsharp masking.

SOURCE CODE:

```
import cv2
import numpy as np
img = cv2.imread("C:/Users/kosur/Pictures/cv/yellowcar.jpeg")
gray = cv2.cvtColor(img, cv2.COLOR_BGR2GRAY)
```

```
laplacian_kernel = np.array([[0, 1, 0],[1, -4, 1],[0, 1, 0]])
laplacian = cv2.filter2D(gray, -1, laplacian_kernel)
sharpened = cv2.add(gray, laplacian)
cv2.imshow('Original Image', gray)
cv2.imshow('Sharpened Image', sharpened)
cv2.waitKey(0)
cv2.destroyAllWindows()
```

OUTPUT:

Q24.

AIM:

Perform Sharpening of Image using High-Boost Masks.

SOURCE CODE:

```
import cv2
import numpy as np
import matplotlib.pyplot as plt
def high_boost_sharpening(image_path, k=1.5):
    original_image = cv2.imread(image_path, cv2.IMREAD_GRAYSCALE)
    blurred_image = cv2.GaussianBlur(original_image, (5, 5), 0)
    high_pass = original_image - blurred_image
    sharpened_image = original_image + k * high_pass
    return original_image, sharpened_image
image_path = "C:/Users/kosur/Pictures/cv/yellowcar.jpeg"
original_image, sharpened_image = high_boost_sharpening(image_path, k=1.5)
```

```
plt.figure(figsize=(10, 5))
plt.subplot(1, 3, 1)
plt.imshow(original_image, cmap='gray')
plt.title('Original Image')
plt.subplot(1, 3, 2)
plt.imshow(sharpened_image, cmap='gray')
plt.title('Sharpened Image')
plt.subplot(1, 3, 3)
plt.imshow(original_image - sharpened_image, cmap='gray')
plt.title('Detail (High-Pass)')
plt.tight_layout()
plt.show()
```

OUTPUT:

Q25

AIM:

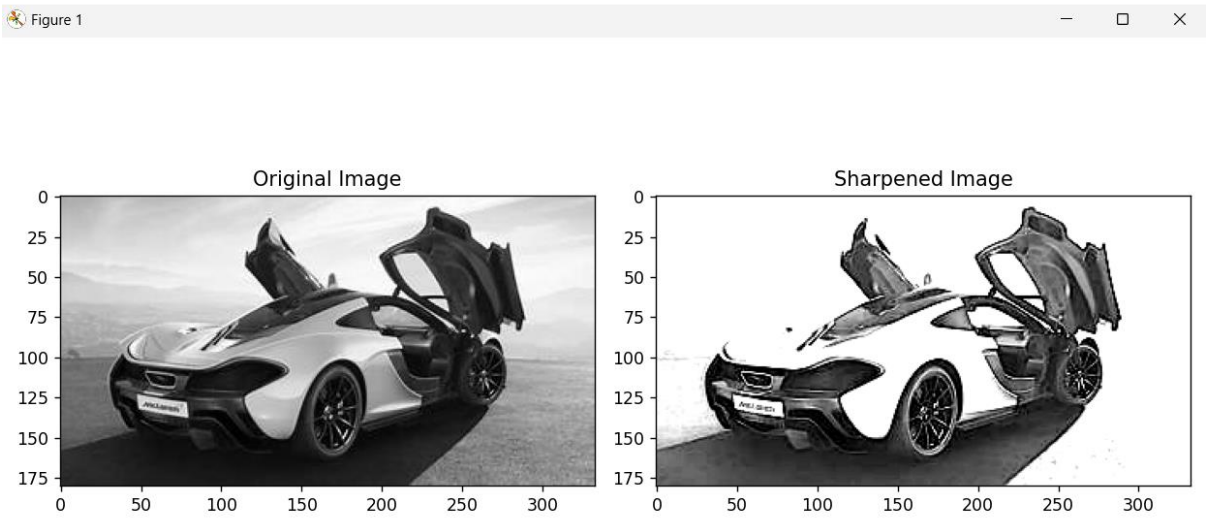
Perform Sharpening of Image using Gradient masking

SOURCE CODE:

```
import cv2
import numpy as np
import matplotlib.pyplot as plt
def sharpen_image_with_gradient(image_path, alpha=1.5):
```

```
    original_image = cv2.imread(image_path, cv2.IMREAD_GRAYSCALE)
    gradient_x = cv2.Sobel(original_image, cv2.CV_64F, 1, 0, ksize=3)
    gradient_y = cv2.Sobel(original_image, cv2.CV_64F, 0, 1, ksize=3)
    gradient_magnitude = np.sqrt(gradient_x**2 + gradient_y**2)
    gradient_magnitude = cv2.normalize(gradient_magnitude, None, 0, 255,
cv2.NORM_MINMAX, cv2.CV_8U)
    sharpened_image = cv2.addWeighted(original_image, 1 + alpha, gradient_magnitude, -
alpha, 0)
    return original_image, sharpened_image
image_path = "C:/Users/kosur/Pictures/cv/yellowcar.jpeg"
original_image, sharpened_image = sharpen_image_with_gradient(image_path, alpha=1.5)
plt.figure(figsize=(10, 5))
plt.subplot(1, 2, 1)
plt.imshow(original_image, cmap='gray')
plt.title('Original Image')
plt.subplot(1, 2, 2)
plt.imshow(sharpened_image, cmap='gray')
plt.title('Sharpened Image')
plt.tight_layout()
plt.show()
```

OUTPUT:



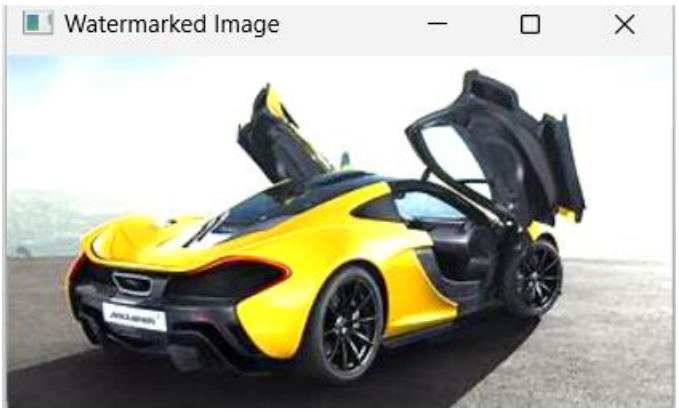
Q26.

AIM:

Insert water marking to the image using OpenCV.

SOURCE CODE:

OUTPUT:



Q27.

AIM:

Do Cropping, Copying and pasting image inside another image using OpenCV

SOURCE CODE:

```
import cv2
import numpy as np
image = cv2.imread("C:/Users/kosur/Pictures/cv/yellowcar.jpeg")
img2 = cv2.imread("C:/Users/kosur/Pictures/cv/yellowcar.jpeg")
print(image.shape) # Print image shape
cv2.imshow("original", image)
imageCopy = image.copy()
cv2.circle(imageCopy, (100, 100), 30, (255, 0, 0), -1)
cv2.imshow('image', image)
cv2.imshow('image copy', imageCopy)
cropped_image = image[80:280, 150:330]
cv2.imshow("cropped", cropped_image)
cv2.imwrite("Cropped Image.jpg", cropped_image)
dst = cv2.addWeighted(image, 0.5, img2, 0.7, 0)
img_arr = np.hstack((image, img2))
cv2.imshow('Input Images',img_arr)
cv2.imshow('Blended Image',dst)
cv2.waitKey(0)
cv2.destroyAllWindows()
```

OUTPUT:

Q28.

AIM:

Find the boundary of the image using Convolution kernel for the given image

SOURCE CODE:

```
import cv2
import numpy as np
img = cv2.imread("C:/Users/kosur/Pictures/cv/yellowcar.jpeg",cv2.IMREAD_GRAYSCALE)
dx = cv2.Sobel(img, cv2.CV_64F, 1, 0)
dy = cv2.Sobel(img, cv2.CV_64F, 0, 1)
edges = cv2.magnitude(dx, dy)
thresh = 100
edges[edges < thresh] = 0
edges[edges >= thresh] = 255
cv2.imshow("Edges", edges)
cv2.waitKey(0)
cv2.destroyAllWindows()
```

OUTPUT:

Q29.

AIM:

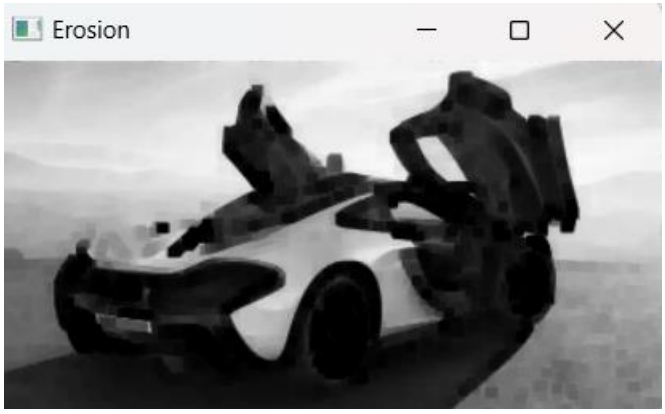
Morphological operations based on OpenCV using Erosion technique

SOURCE CODE:

```
import cv2
import numpy as np
img = cv2.imread("C:/Users/kosur/Pictures/cv/yellowcar.jpeg",cv2.IMREAD_GRAYSCALE)
kernel = np.ones((5,5), np.uint8)
erosion = cv2.erode(img, kernel, iterations=1)
cv2.imshow("Original", img)
cv2.imshow("Erosion", erosion)
```

```
cv2.waitKey(0)
cv2.destroyAllWindows()
```

OUTPUT:



Q30.

AIM:

Morphological operations based on OpenCV using Dilation technique

SOURCE CODE:

```
import cv2
import numpy as np
img = cv2.imread("C:/Users/kosur/Pictures/cv/yellowcar.jpeg", cv2.IMREAD_GRAYSCALE)
kernel = np.ones((5,5), np.uint8)
dilation = cv2.dilate(img, kernel, iterations=1)
cv2.imshow("Original", img)
cv2.imshow("Dilation", dilation)
cv2.waitKey(0)
cv2.destroyAllWindows()
```

OUTPUT:

Q31.

AIM:

Morphological operations based on OpenCV using Opening technique.

SOURCE CODE:

```
import cv2
import numpy as np
img = cv2.imread("C:/Users/kosur/Pictures/cv/yellowcar.jpeg", cv2.IMREAD_GRAYSCALE)
kernel = np.ones((5,5), np.uint8)
opening = cv2.morphologyEx(img, cv2.MORPH_OPEN, kernel)
cv2.imshow("Original", img)
cv2.imshow("opening", opening)
cv2.waitKey(0)
cv2.destroyAllWindows()
```

OUTPUT:

Q32.

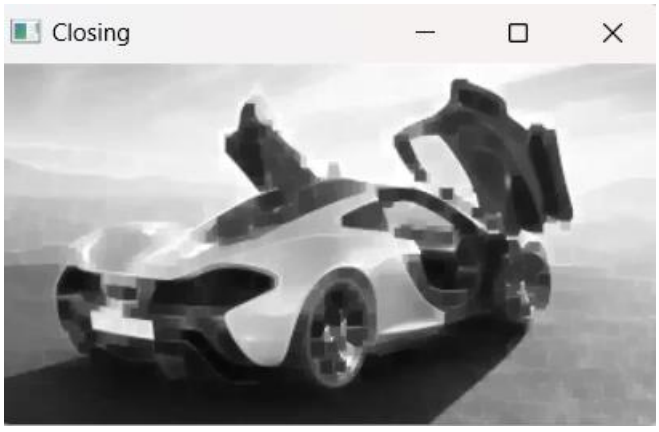
AIM:

Morphological operations based on OpenCV using Closing technique.

SOURCE CODE:

```
import cv2
import numpy as np
img = cv2.imread("C:/Users/kosur/Pictures/cv/yellowcar.jpeg", cv2.IMREAD_GRAYSCALE)
kernel = np.ones((5,5), np.uint8)
closing = cv2.morphologyEx(img, cv2.MORPH_CLOSE, kernel)
cv2.imshow("Original", img)
cv2.imshow("Closing", closing)
cv2.waitKey(0)
cv2.destroyAllWindows()
```

OUTPUT:



Q33.

AIM:

Morphological operations based on OpenCV using Morphological Gradient technique

SOURCE CODE:

```
import cv2
import numpy as np
img = cv2.imread("C:/Users/kosur/Pictures/cv/yellowcar.jpeg", cv2.IMREAD_GRAYSCALE)
kernel = np.ones((5,5), np.uint8)
grad = cv2.morphologyEx(img, cv2.MORPH_GRADIENT, kernel)
cv2.imshow("Original", img)
cv2.imshow("Gradient", grad)
cv2.waitKey
```

OUTPUT:

Q34.

AIM:

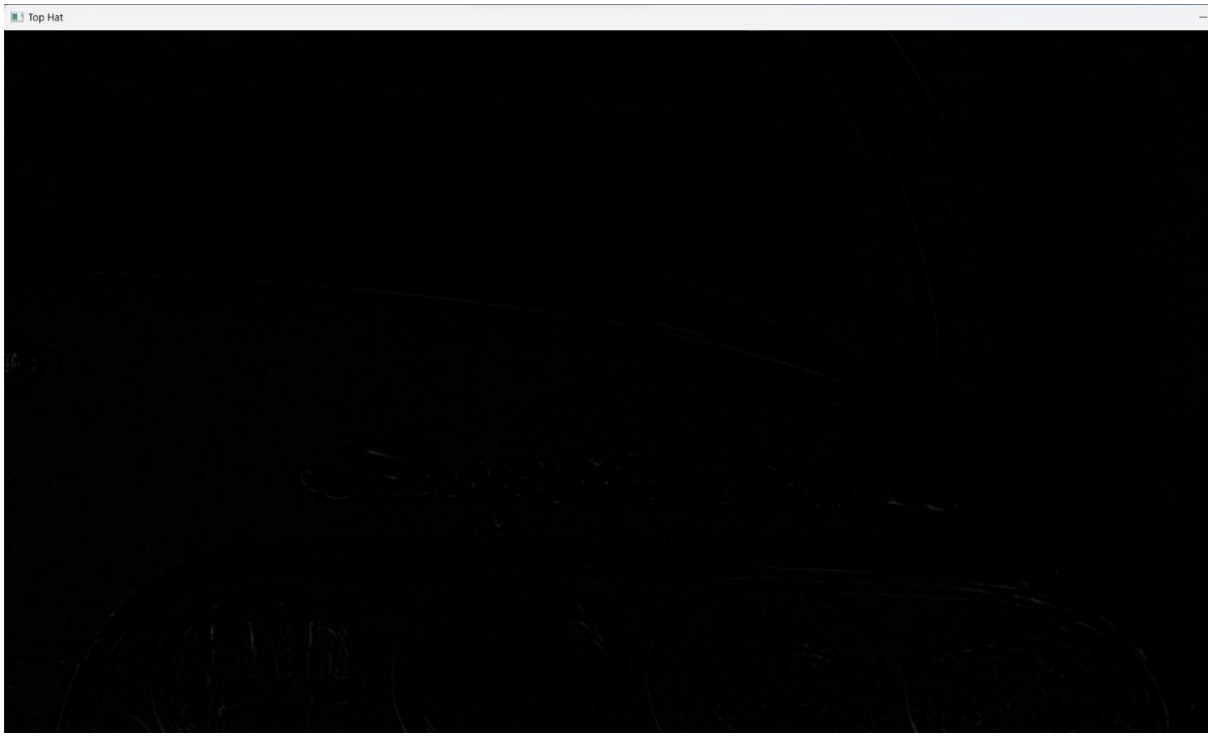
Morphological operations based on OpenCV using Top hat technique.

SOURCE CODE:

```
import cv2
import numpy as np
img = cv2.imread("C:/Users/kosur/Pictures/cv/yellowcar.jpeg",cv2.IMREAD_GRAYSCALE)
kernel = np.ones((5,5), np.uint8)
tophat = cv2.morphologyEx(img, cv2.MORPH_TOPHAT, kernel)
cv2.imshow("Original", img)
cv2.imshow("Top Hat", tophat)
cv2.waitKey(0)
```

cv2.destroyAllWindows()

OUTPUT:



Q35.

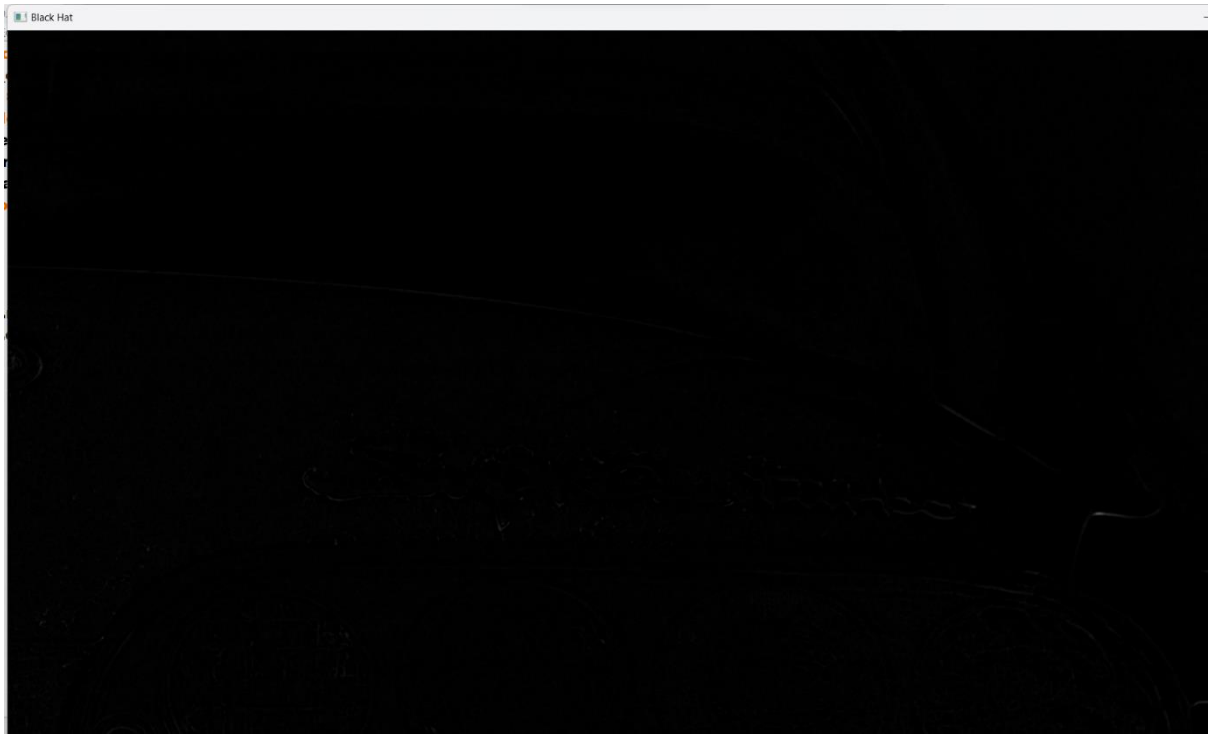
AIM:

Morphological operations based on OpenCV using Black hat technique.

SOURCE CODE:

```
import cv2
import numpy as np
img = cv2.imread("C:/Users/kosur/Pictures/cv/yellowcar.jpeg",cv2.IMREAD_GRAYSCALE)
kernel = np.ones((5,5), np.uint8)
blackhat = cv2.morphologyEx(img, cv2.MORPH_BLACKHAT, kernel)
cv2.imshow("Original", img)
cv2.imshow("Black Hat", blackhat)
cv2.waitKey(0)
cv2.destroyAllWindows()
```

OUTPUT:



Q36.

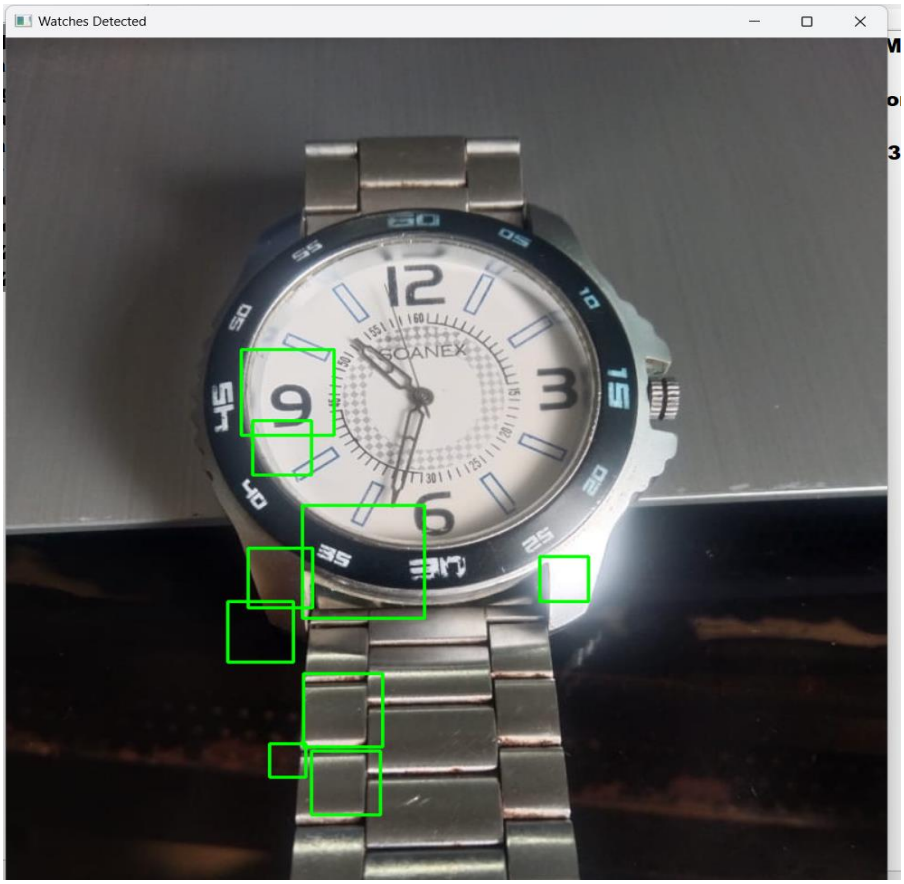
AIM:

Recognise watch from the given image by general Object recognition using OpenCV.

SOURCE CODE:

```
import cv2
watch_cascade = cv2.CascadeClassifier("C://Users//ASHIK C
SABU//Desktop//supraaa//Object-Detection-using-OpenCV-master//watch-cascade.xml")
img = cv2.imread("C://Users//ASHIK C SABU//Desktop//supraaa//watch.jpg")
gray = cv2.cvtColor(img, cv2.COLOR_BGR2GRAY)
watches = watch_cascade.detectMultiScale(gray, scaleFactor=1.2, minNeighbors=5)
for (x, y, w, h) in watches:
   cv2.rectangle(img, (x, y), (x + w, y + h), (0, 255, 0), 2)
   cv2.imshow('Watches Detected', img)
cv2.waitKey(0)
cv2.destroyAllWindows()
```

OUTPUT:



Q37.

AIM:

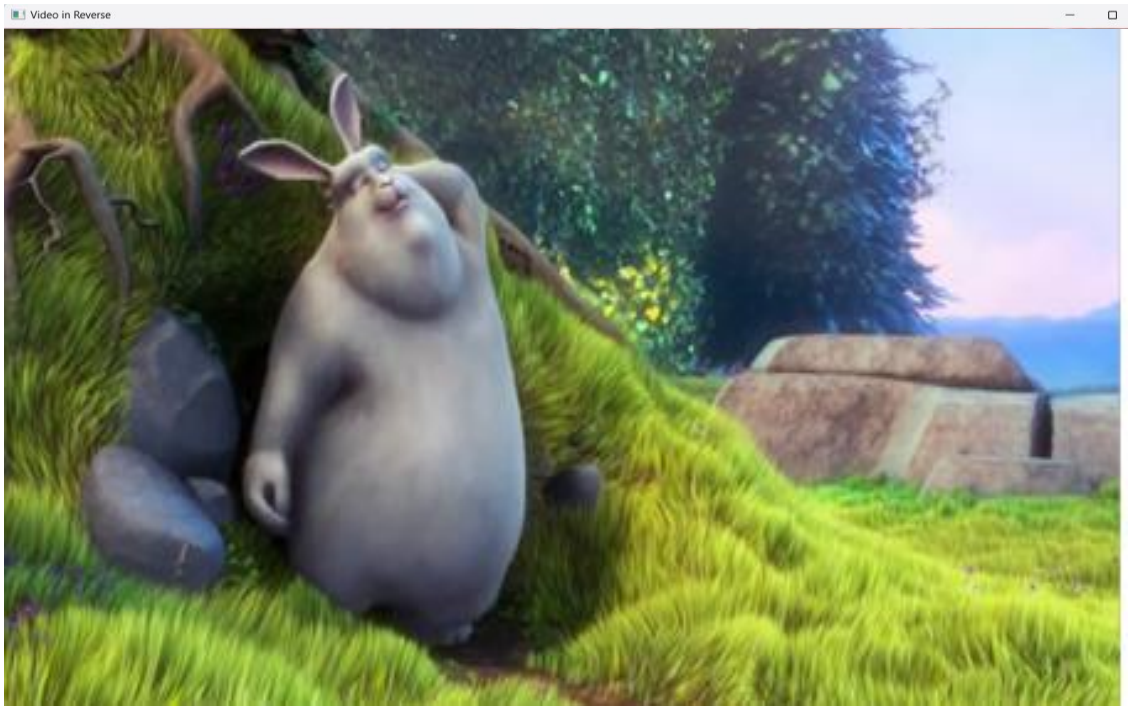
Using Opencv play Video in Reverse mode.

SOURCE CODE:

```
import cv2
cap = cv2.VideoCapture("C://Users//ASHIK C SABU//Desktop//supraaa//car.mp4")
total_frames = cap.get(cv2.CAP_PROP_FRAME_COUNT)
current_frame = total_frames - 1
while current_frame >= 0:
    cap.set(cv2.CAP_PROP_POS_FRAMES, current_frame)
    ret, frame = cap.read()
    if not ret:
        break
    cv2.imshow('Video in Reverse', frame)
    if cv2.waitKey(25) & 0xFF == ord('q'):
```

```
        break
    current_frame -= 1
cap.release()
cv2.destroyAllWindows()
```

OUTPUT:



Q38.

AIM:

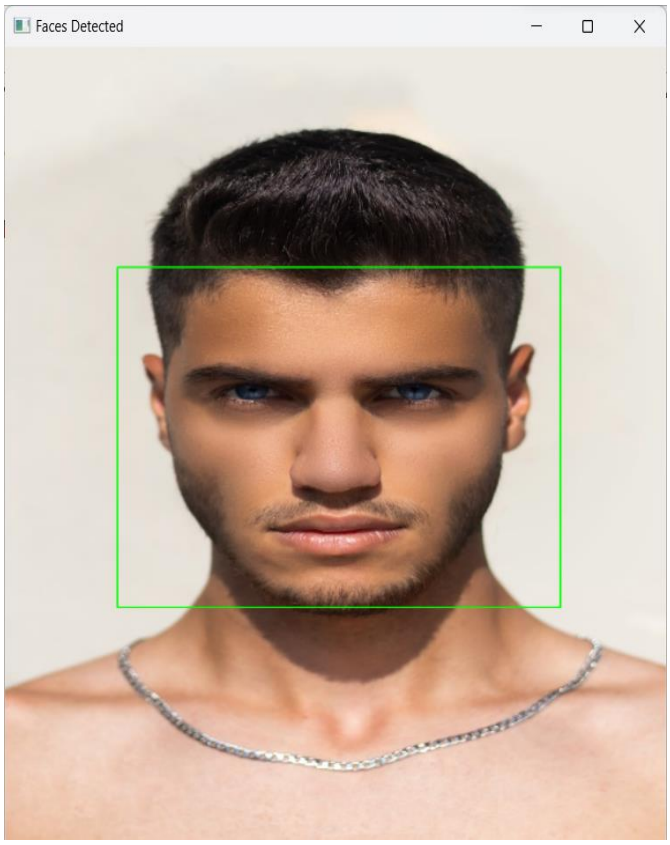
Face Detection using Opencv

SOURCE CODE:

```
import cv2
img = cv2.imread("C://Users//ASHIK C SABU//Desktop//supraaa//face.jpeg")
gray = cv2.cvtColor(img, cv2.COLOR_BGR2GRAY)
face_cascade =cv2.CascadeClassifier("C://Users//ASHIK C
SABU//Desktop//supraaa//haarcascade_frontalface_default.xml")
faces = face_cascade.detectMultiScale(gray, scaleFactor=1.1, minNeighbors=5)
for (x, y, w, h) in faces:
    cv2.rectangle(img, (x, y), (x + w, y + h), (0, 255, 0), 2)
    img1 = cv2.resize(img,(600,600))
    cv2.imshow('Faces Detected', img1)
cv2.waitKey(0)
```

cv2.destroyAllWindows()

OUTPUT:



Q39.

AIM:

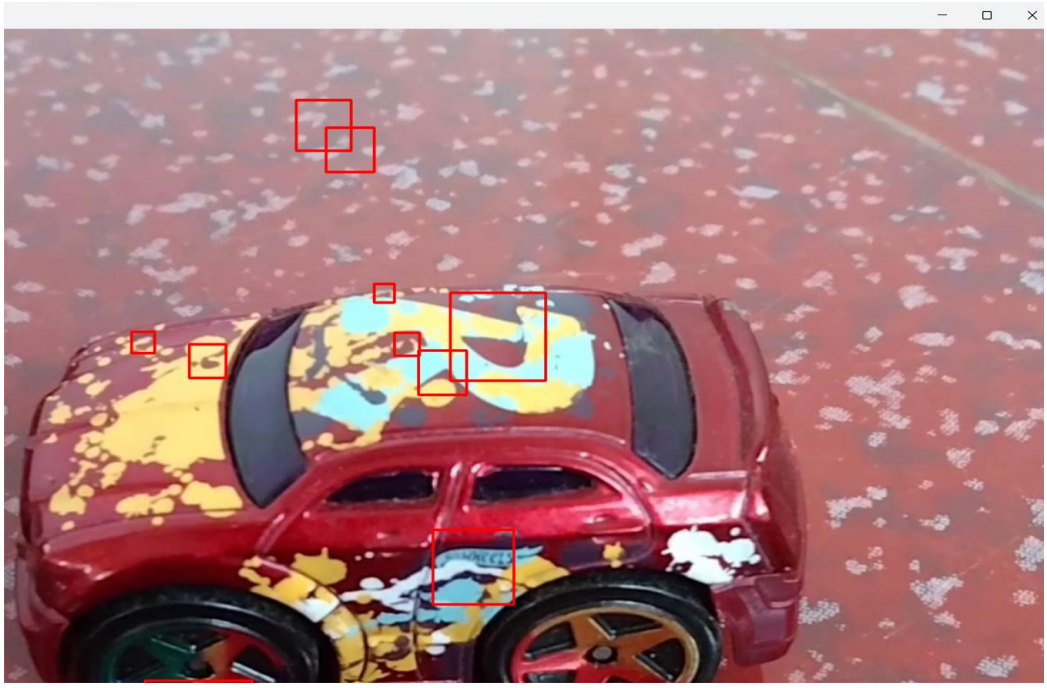
Vehicle Detection in a Video frame using OpenCV

SOURCE CODE:

```
import cv2
car_cascade = cv2.CascadeClassifier("C://Users//ASHIK C
SABU//Desktop//supraaa//cars.xml")
cap = cv2.VideoCapture("C://Users//ASHIK C SABU//Desktop//supraaa//car.mp4")
while True:
    ret, frame = cap.read()
    gray = cv2.cvtColor(frame, cv2.COLOR_BGR2GRAY)
    cars = car_cascade.detectMultiScale(gray, 1.1, 1)
    for (x,y,w,h) in cars:
        cv2.rectangle(frame, (x,y), (x+w,y+h), (0,0,255), 2)
        cv2.imshow('frame', frame)
```

```
        if cv2.waitKey(1) & 0xFF == ord('q'):
            break
cap.release()
cv2.destroyAllWindows()
```

OUTPUT:



Q40.

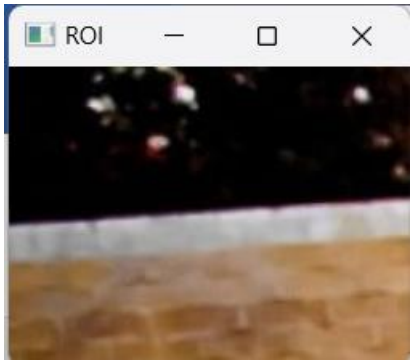
AIM:

Draw Rectangular shape and extract objects

SOURCE CODE:

```
import cv2
img = cv2.imread("C:/Users/kosur/Pictures/cv/yellowcar.jpeg")
x, y = 100, 100
width, height = 200, 150
roi = img[y:y+height, x:x+width]
cv2.imshow('ROI', roi)
cv2.waitKey(0)
cv2.destroyAllWindows()
```

OUTPUT:


ROI