Experiment1.1

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Subject Name: Computer Vision Lab — **Subject Code**: 20CSP-422

Aim:

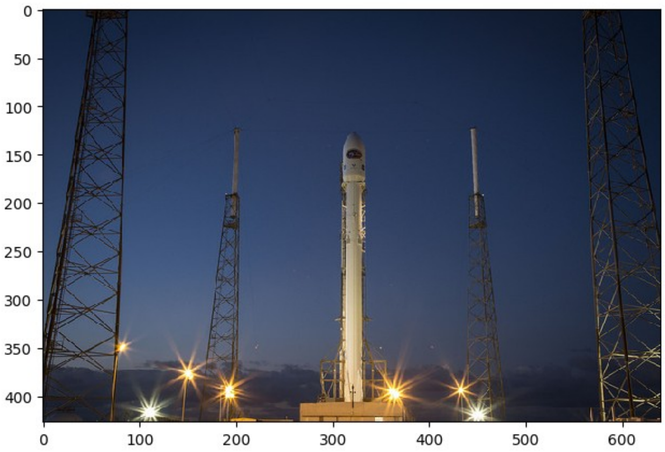
Write a program to implement various feature extraction techniques for image classification.

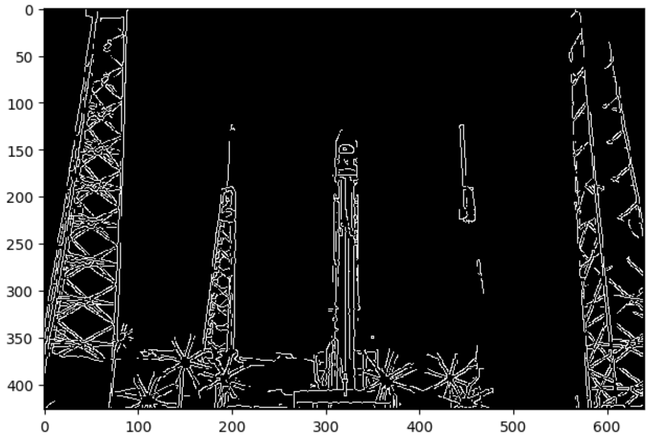
Software Required: Google colab notebook

Feature extraction: Edge Detection -

```
import skimage.color import rgb2gray
from skimage.feature import canny
rocket = data.rocket()
io.imshow(rocket), plt.show()
rocket = color.rgb2gray(rocket)
rocket_edges = canny(rocket)
io.imshow(rocket_edges)
plt.show()
```

Output:

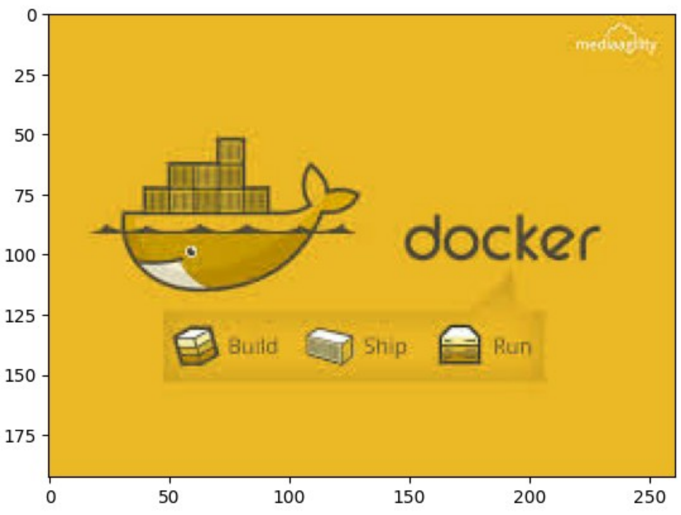


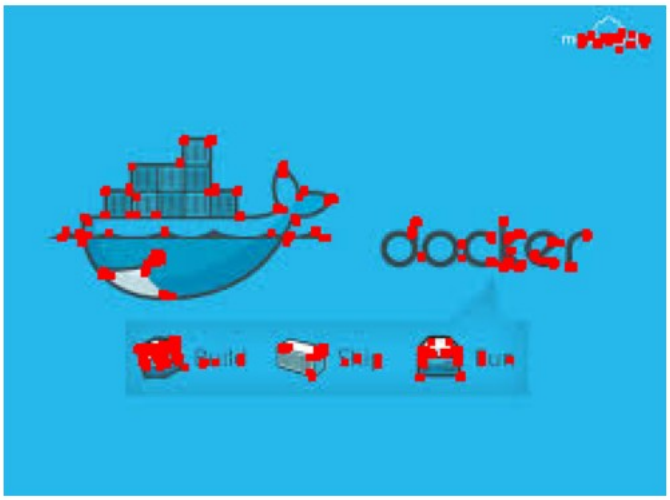


Harris Corner Detector:

```
import numpy as np
import cv2 as cv
import matplotlib.pyplot as plt
filename = '/content/dockerI2.jpeg'
img = cv.imread(filename)
plt.imshow(img)
plt.show()
gray = cv.cvtColor(img, cv.COLOR_BGR2GRAY)
gray = np.float32(gray)
dst = cv.cornerHarris(gray, 2, 3, 0.04)
# Result is dilated for marking the corners, not important
dst = cv.dilate(dst, None)
img[dst > 0.01 * dst.max()] = [0, 0, 255]
# Convert BGR to RGB for displaying with matplotlib
img_rgb = cv.cvtColor(img, cv.COLOR_BGR2RGB)
plt.imshow(img_rgb)
plt.axis('off') # Turn off axis numbers and ticks
plt.show()
```

Output:

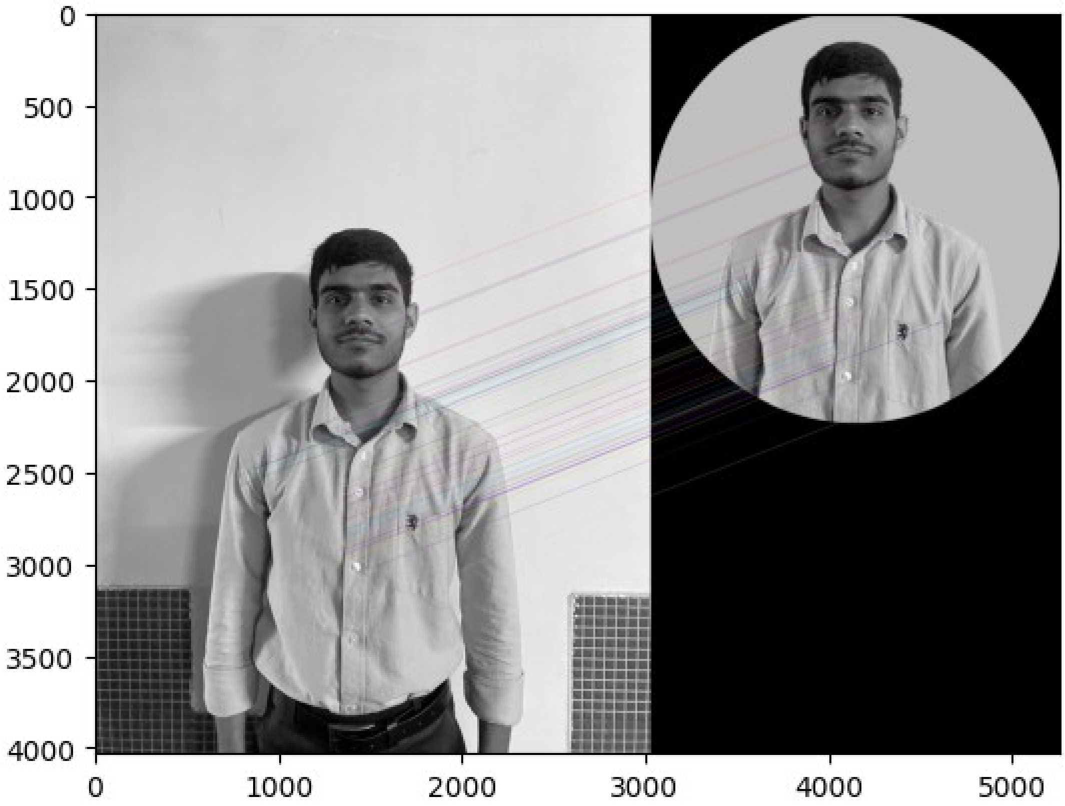




Scale-Invariant Feature Transform (SIFT):

```
import cv2
import matplotlib,
%matplotlib inline
img1 = cv2.imread('/content/IMG_5160.png')
img2 = cv2.imread('/content/fotor_2023-5-26_21_26_26.png')
img1 = cv2.cvtColor(img1, cv2.COLOR_BGR2GRAY)
img2 = cv2.cvtColor(img2, cv2.COLOR_BGR2GRAY)
sift = cv2.xfeatures2d.SIFT_create()
keypoints_1, descriptors_1 = sift.detectAndCompute(img1,None)
keypoints_2, descriptors_2 = sift.detectAndCompute(img2,None)
bf = cv2.BFMatcher(cv2.NORM_L1, crossCheck=True)
matches = bf.match(descriptors_1,descriptors_2)
matches = sorted(matches, key = lambda x:x.distance)
img3 = cv2.drawMatches(img1, keypoints_1, img2, keypoints_2,
matches[:50], img2, flags=2)
plt.imshow(img3),plt.show()
```

Output: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