A.I

LAB TASK 10

Name: Syed Muzzamil Waseem

SID: 11067

CID: 110089

QUESTION

import numpy as npimport cv2

from google.colab.patches

import cv2\_imshow

import matplotlib.pyplot as plt

%matplotlib inline image1=cv2.imread('/content/mountains.jpg') training\_image = cv2.cvtColor(image1, cv2.COLOR\_BGR2RGB)

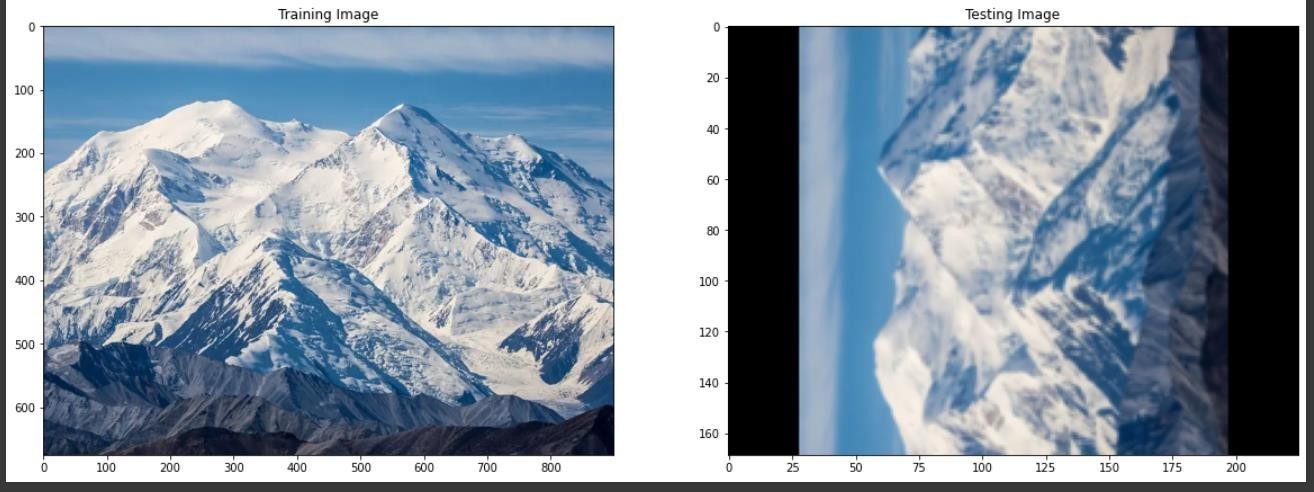
training\_gray = cv2.cvtColor(training\_image, cv2.COLOR\_RGB2GRAY) test\_image = cv2.pyrDown(training\_image)

test\_image = cv2.pyrDown(test\_image) num\_rows, num\_cols = test\_image.shape[:2]

rotation\_matrix = cv2.getRotationMatrix2D((num\_cols/2, num\_rows/2),90,1) test\_image=cv2.warpAffine(test\_image,rotation\_matrix,(num\_cols,num\_rows))

test\_gray = cv2.cvtColor(test\_image, cv2.COLOR\_RGB2GRAY) fx, plots = plt.subplots(1, 2, figsize=(20,10))

plots[0].set\_title("Training Image") plots[0].imshow(training\_image)



orb = cv2.ORB\_create()

train\_keypoints, train\_descriptor = orb.detectAndCompute(training\_gray, None)

test\_keypoints, test\_descriptor = orb.detectAndCompute(test\_gray, None)

keypoints\_without\_size = np.copy(training\_image)

keypoints\_with\_size = np.copy(training\_image)

cv2.drawKeypoints(training\_image, train\_keypoints, keypoints\_without\_size,color = (0, 255, 0))

cv2.drawKeypoints(training\_image, train\_keypoints, keypoints\_with\_size, flags = cv2.DRAW\_MATCHES\_FLAGS\_DRAW\_RICH\_KEYPOINTS)

sizefx, plots = plt.subplots(1, 2, figsize=(20,10))

plots[0].set\_title("Train keypoints With Size") plots[0].imshow(keypoints\_with\_size, cmap='gray')

plots[1].set\_title("Train keypoints Without Size") plots[1].imshow(keypoints\_without\_size, cmap='gray')

print("Number of Keypoints Detected In The Training Image: ", len(train\_ke ypoints))

print("Number of Keypoints Detected In The Query Image: ", len(test\_keypoints))



bf = cv2.BFMatcher(cv2.NORM\_HAMMING, crossCheck = True) matches = bf.match(train\_descriptor, test\_descriptor)= sorted (matches, key = lambda x : x.distance)

result = cv2.drawMatches(training\_image, train\_keypoints, test\_gray, test\_ keypoints, matches, test\_gray, flags = 2)

plt.rcParams['figure.figsize'] = [14.0, 7.0] plt.title('Best Matching Points') plt.imshow(result)

plt.show()

print("\nNumber of Matching Keypoints Between The Training and Query Image s: ", len(matches)

