Assignment 1

Class: BS-VIII (CS)   **Course Instructor: Dr. Asif Rajput**

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Task

Assume that you are supposed to create your first Augmented Reality application in which you are supposed to place Sukkur IBA logo onto a planar surface of your choice in real-time. The task may seem difficult at first however if you decompose the task into smaller ones (such as, SIFT detection, matching followed by perspective transformation and image-warping) the task can easily be achieved using traditional computer vision application

Code

```python
import cv2
import matplotlib.pyplot as plt
import time


sift = cv2.SIFT_create()

bf = cv2.BFMatcher(cv2.NORM_L2, crossCheck=True)


cap = cv2.VideoCapture("inp_video.mp4")


while cap.isOpened():

    suc, img1 = cap.read()
    img2 = img1

    start = time.time()

    img1 = cv2.cvtColor(img1, cv2.COLOR_BGR2GRAY)
    img2 = cv2.cvtColor(img2, cv2.COLOR_BGR2GRAY)

    keypoints_1, descriptors_1 = sift.detectAndCompute(img1,None)
    keypoints_2, descriptors_2 = sift.detectAndCompute(img2,None)
```

```
    matches = bf.match(descriptors_1,descriptors_2)
    matches = sorted(matches, key = lambda x:x.distance)

    end = time.time()
    totalTime = end - start

    fps = 1 / totalTime

    img3 = cv2.drawMatches(img1, keypoints_1, img2, keypoints_2, matches[:600],
img2, flags=2)
    cv2.putText(img3, f'FPS: {int(fps)}', (20,450), cv2.FONT_HERSHEY_SIMPLEX,
1.5, (0,255,0), 2)
    cv2.imshow('SIFT', img3)

    if cv2.waitKey(5) & 0xFF == 27:
        break

cap.release()
```

Explanation to the Code

First of all, necessary libraries are imported. After it, a variable for sift features is created which will map the matching sequence of input to the output. To match key point descriptions, BFMatcher is utilized. Finding the most comparable description across many photos is the simplest way to match descriptors. The BFMatcher match technique accomplishes this by identifying the best feature match for each descriptor from the given image. Next, we have given the input video, then separated each frame from video and fount the best match in that frame and map that match on the video. At last, a label text is shown on the output video and the video is finally displayed as an output.

Application Domain

Some potential applications of this computer vision are like image matching, object detection, scene detection, thief detection, matching movie scenes and image processing etc.

Future Work

Computation cost reduced

The process of lowering similar measure matching cost is stated as a way to increase the effectiveness of the SIFT feature matching algorithm. In order to reduce character points while

computing using the results of part feature, the Euclidean distance is substituted with a linear mixture of city block distance and chessboard distance.

The End.