

```
In [1]: import cv2
import matplotlib.pyplot as plt
import numpy as np
%matplotlib inline
```

```
In [5]: # Load the image
image = cv2.imread('images/subs.jpeg')
face = cv2.cvtColor(image, cv2.COLOR_BGR2RGB)
face_gray = cv2.cvtColor(face, cv2.COLOR_RGB2GRAY)

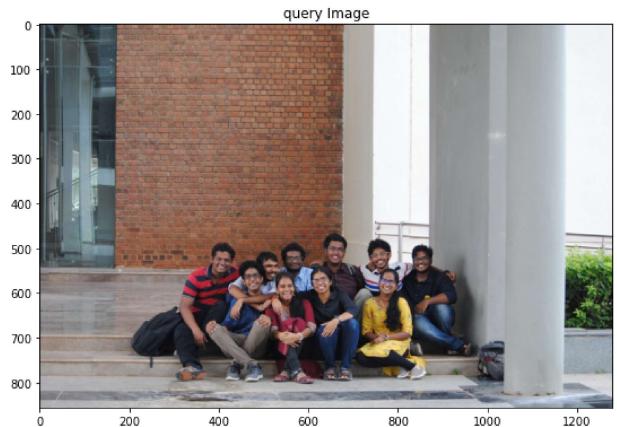
query = cv2.imread('images/grp1.jpeg')
query = cv2.cvtColor(query, cv2.COLOR_BGR2RGB)
query_gray = cv2.cvtColor(query, cv2.COLOR_RGB2GRAY)

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

plots[0].set_title("face Image")
plots[0].imshow(face)

plots[1].set_title("query Image")
plots[1].imshow(query)
```

Out[5]: <matplotlib.image.AxesImage at 0x2915b213bb0>



```
In [7]: sift = cv2.SIFT_create()

face_keypoints, face_descriptor = sift.detectAndCompute(face_gray, None)
query_keypoints, query_descriptor = sift.detectAndCompute(query_gray, None)

keypoints_without_size = np.copy(face)
keypoints_with_size = np.copy(face)

cv2.drawKeypoints(face, face_keypoints, keypoints_without_size, color = (0, 255, 0))
```

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

plots[0].set_title("Face keypoints With Size")
plots[0].imshow(keypoints_with_size, cmap='gray')

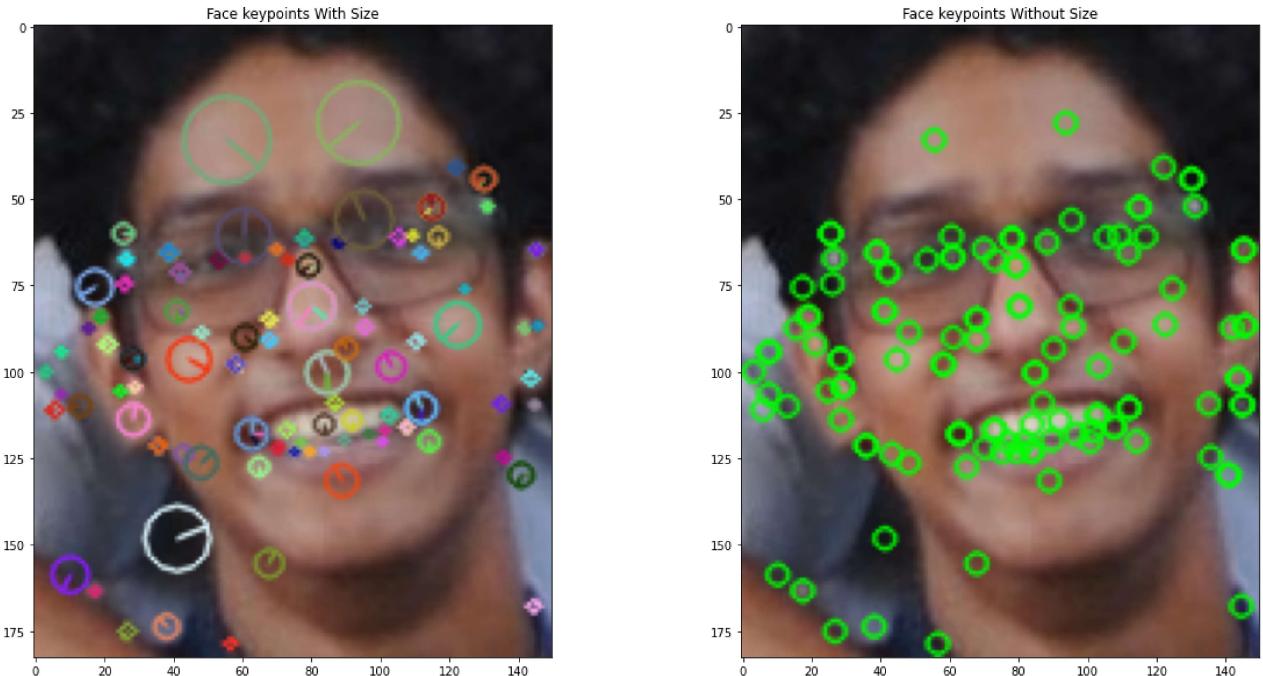
plots[1].set_title("Face keypoints Without Size")
plots[1].imshow(keypoints_without_size, cmap='gray')

print("Number of Keypoints Detected In The Training Image: ", len(face_keypoints))

print("Number of Keypoints Detected In The Query Image: ", len(query_keypoints))
```

Number of Keypoints Detected In The Training Image: 124

Number of Keypoints Detected In The Query Image: 4287



In [9]:

```
bf = cv2.BFMatcher()
matches=bf.knnMatch(face_descriptor,query_descriptor,k=2)
good = []
for m,n in matches:
    if m.distance < 0.75*n.distance:
        good.append([m])
```

In [10]:

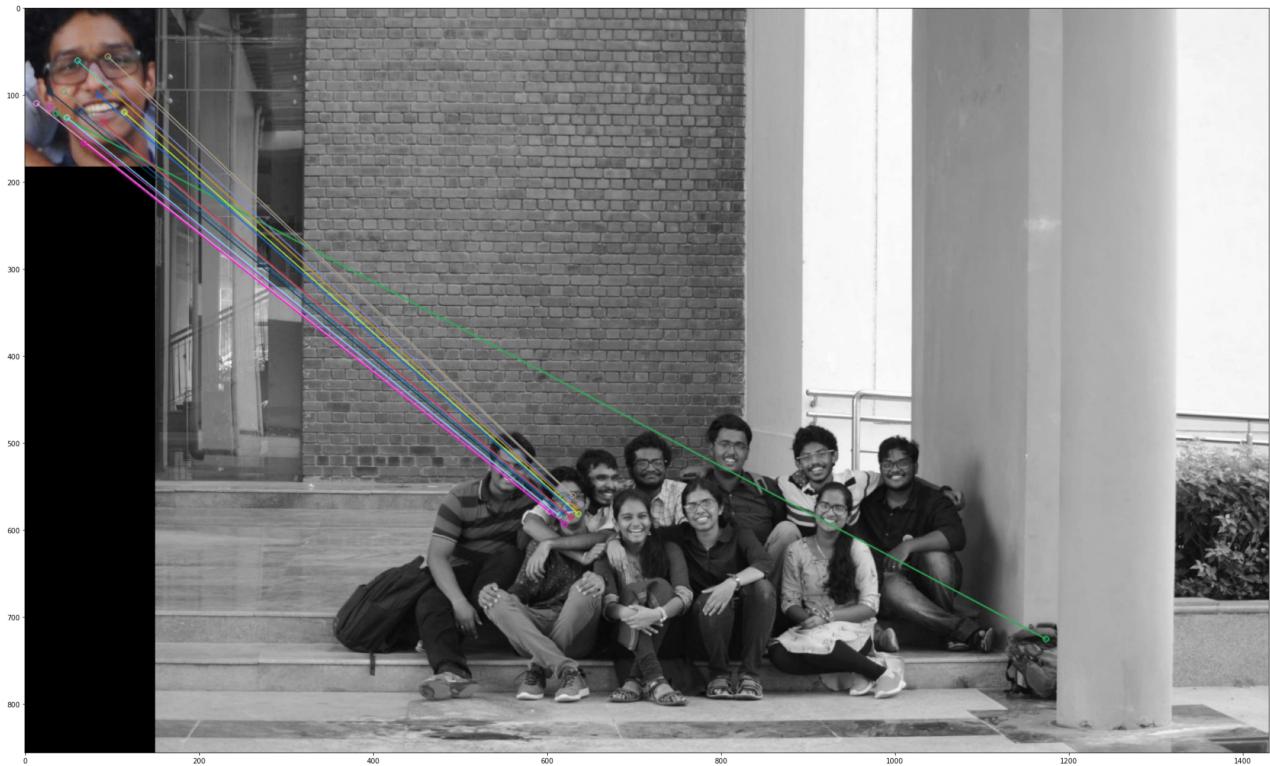
```
print(len(matches))
print(len(good))
```

124
18

In [11]:

```
img3 = cv2.drawMatchesKnn(face,face_keypoints,query_gray,query_keypoints,good,query_gra
plt.figure(figsize=(40,20))
plt.imshow(img3)
plt.show()
```

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In []:

In []:

In [12]:

```

def face_recog_sift(query_image, face_image):
    image1 = cv2.imread('images/'+face_image)
    training_image = cv2.cvtColor(image1, cv2.COLOR_BGR2RGB)
    training_gray = cv2.cvtColor(training_image, cv2.COLOR_RGB2GRAY)

    test_image = cv2.imread('images/'+query_image)
    test_image = cv2.cvtColor(test_image, cv2.COLOR_BGR2RGB)
    test_gray = cv2.cvtColor(test_image, cv2.COLOR_RGB2GRAY)
    sift = cv2.SIFT_create()

    train_keypoints, train_descriptor = sift.detectAndCompute(training_gray, None)
    test_keypoints, test_descriptor = sift.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 =
    cv2.drawKeypoints(training_image, train_keypoints, keypoints_with_size, flags = cv2

    print("Number of Keypoints Detected In The Training Image: ", len(train_keypoints))
    print("Number of Keypoints Detected In The Query Image: ", len(test_keypoints))

    bf = cv2.BFMatcher()
    matches=bf.knnMatch(train_descriptor,test_descriptor,k=2)
    good = []
    for m,n in matches:
        if m.distance < 0.75*n.distance:

```

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```
img3 = cv2.drawMatchesKnn(training_image,train_keypoints,test_gray,test_keypoints,g)

plt.figure(figsize=(40,20))
plt.imshow(img3)
plt.show()
```

In [13]:

```
def _face_recog_sift(query_image, face_image):
    image1 = cv2.imread('images/' + face_image)
    train_image = cv2.cvtColor(image1, cv2.COLOR_BGR2RGB)
    train_gray = cv2.cvtColor(train_image, cv2.COLOR_RGB2GRAY)

    test_image = cv2.imread('images/' + query_image)
    test_image = cv2.cvtColor(test_image, cv2.COLOR_BGR2RGB)
    test_gray = cv2.cvtColor(test_image, cv2.COLOR_RGB2GRAY)
    sift = cv2.SIFT_create()

    train_keypoints, train_descriptor = sift.detectAndCompute(train_gray, None)
    test_keypoints, test_descriptor = sift.detectAndCompute(test_gray, None)

    bf = cv2.BFMatcher()
    matches = bf.knnMatch(train_descriptor, test_descriptor, k=2)
    good = []
    for m, n in matches:
        if m.distance < 0.75 * n.distance:
            good.append([m])
    return len(good)
```

In [14]:

```
def recog(query_image, face1, face2):
    fig = plt.figure(figsize=(10, 7))
    rows = 1
    columns = 3

    query = cv2.cvtColor(cv2.imread('images/' + query_image), cv2.COLOR_BGR2RGB)
    f1 = cv2.cvtColor(cv2.imread('images/' + face1), cv2.COLOR_BGR2RGB)
    f2 = cv2.cvtColor(cv2.imread('images/' + face2), cv2.COLOR_BGR2RGB)
    fig.add_subplot(rows, columns, 1)

    plt.imshow(query)
    plt.axis('off')
    plt.title("Query image")

    fig.add_subplot(rows, columns, 2)

    plt.imshow(f1)
    plt.axis('off')
    plt.title("Face 1")

    fig.add_subplot(rows, columns, 3)

    plt.imshow(f2)
    plt.axis('off')
    plt.title("Face 2")

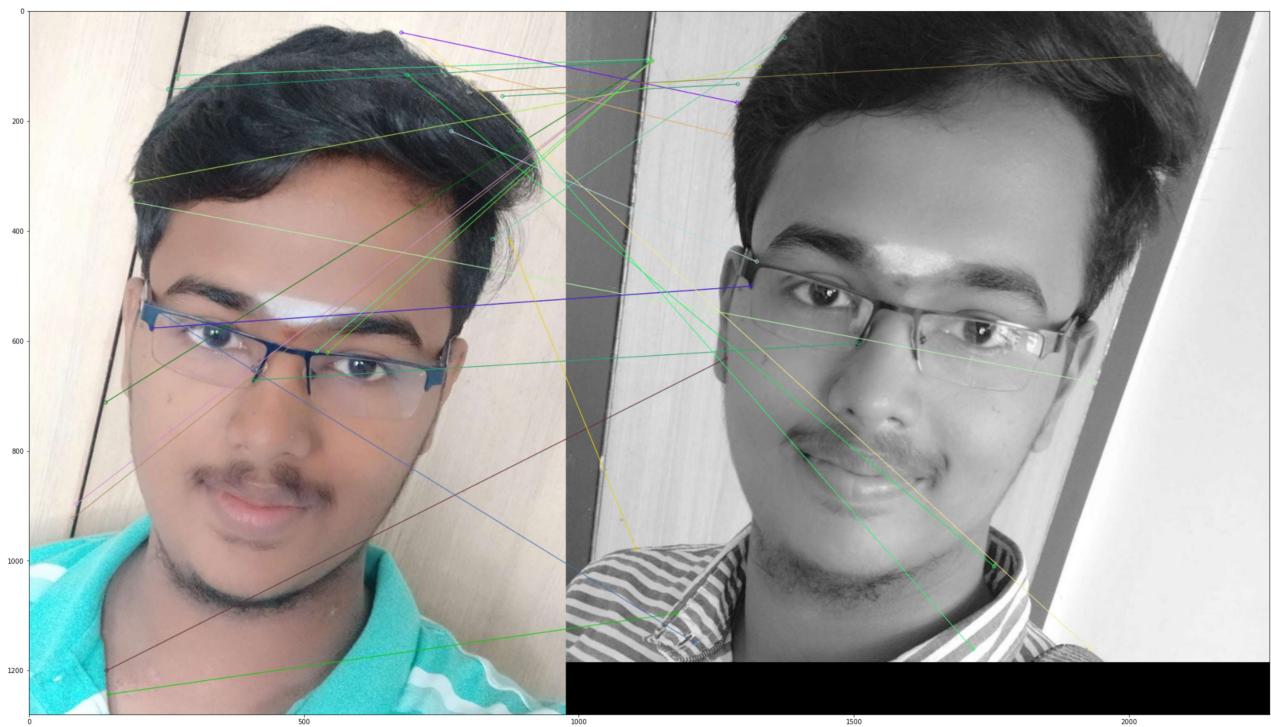
    if _face_recog_sift(query_image, face2) > _face_recog_sift(query_image, face1):
        face2
```

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```
else:  
    face_recog_sift(query_image, face1)
```

In [15]: `recog('harish3.jpeg','sindu2.jpeg','harish2.jpeg')`

Number of Keypoints Detected In The Training Image: 1179
Number of Keypoints Detected In The Query Image: 1608



In [16]: `recog('sindu2.jpeg','sindu3.jpeg','harish.jpeg')`

Number of Keypoints Detected In The Training Image: 1085
Number of Keypoints Detected In The Query Image: 60

Query image



Face 1



Face 2



```
In [17]: recog('half-grp1.jpeg','sindu2.jpeg','harish2.jpeg')
```

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Number of Keypoints Detected In The Query Image: 1808

Query image

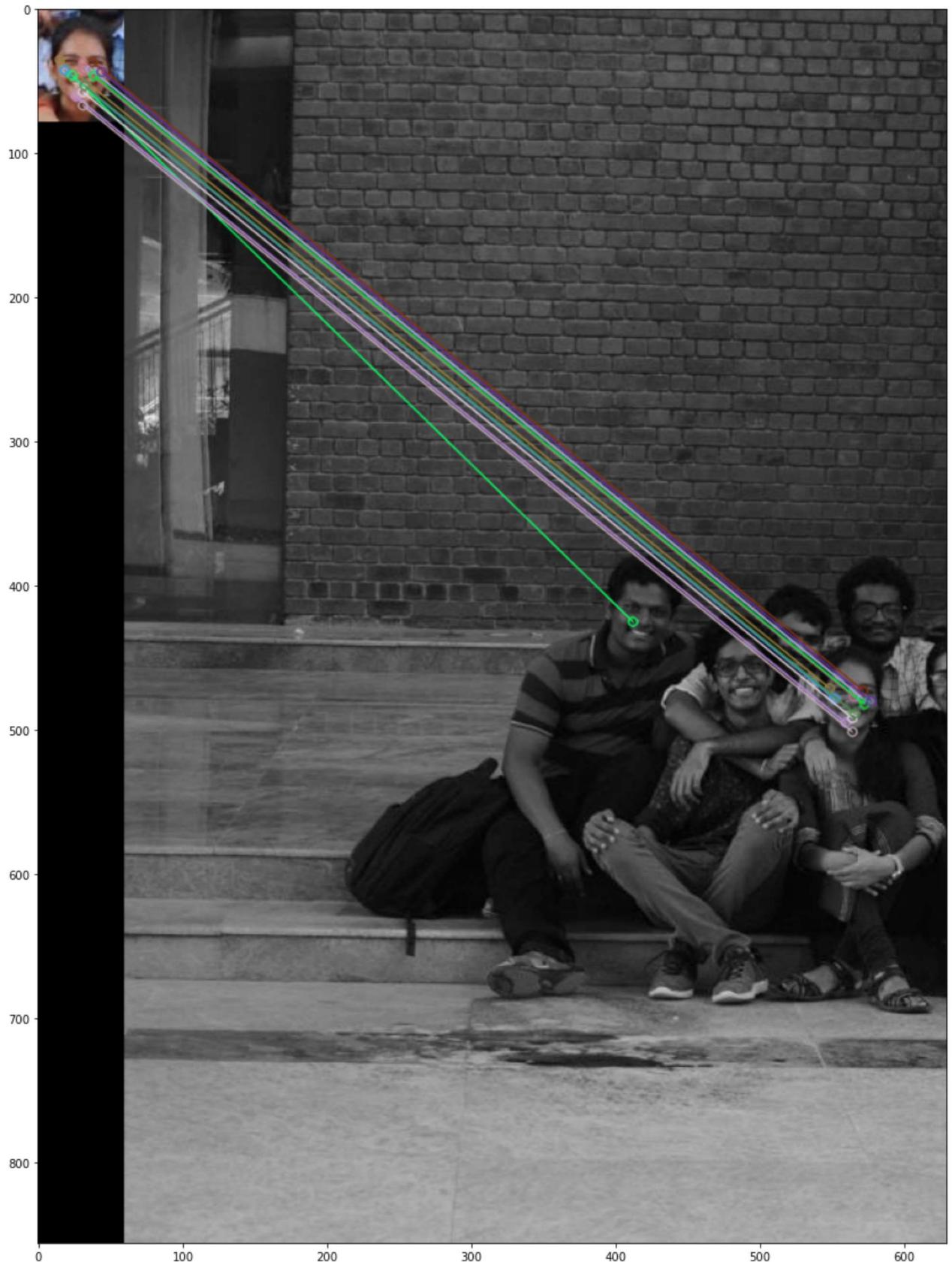


Face 1



Face 2

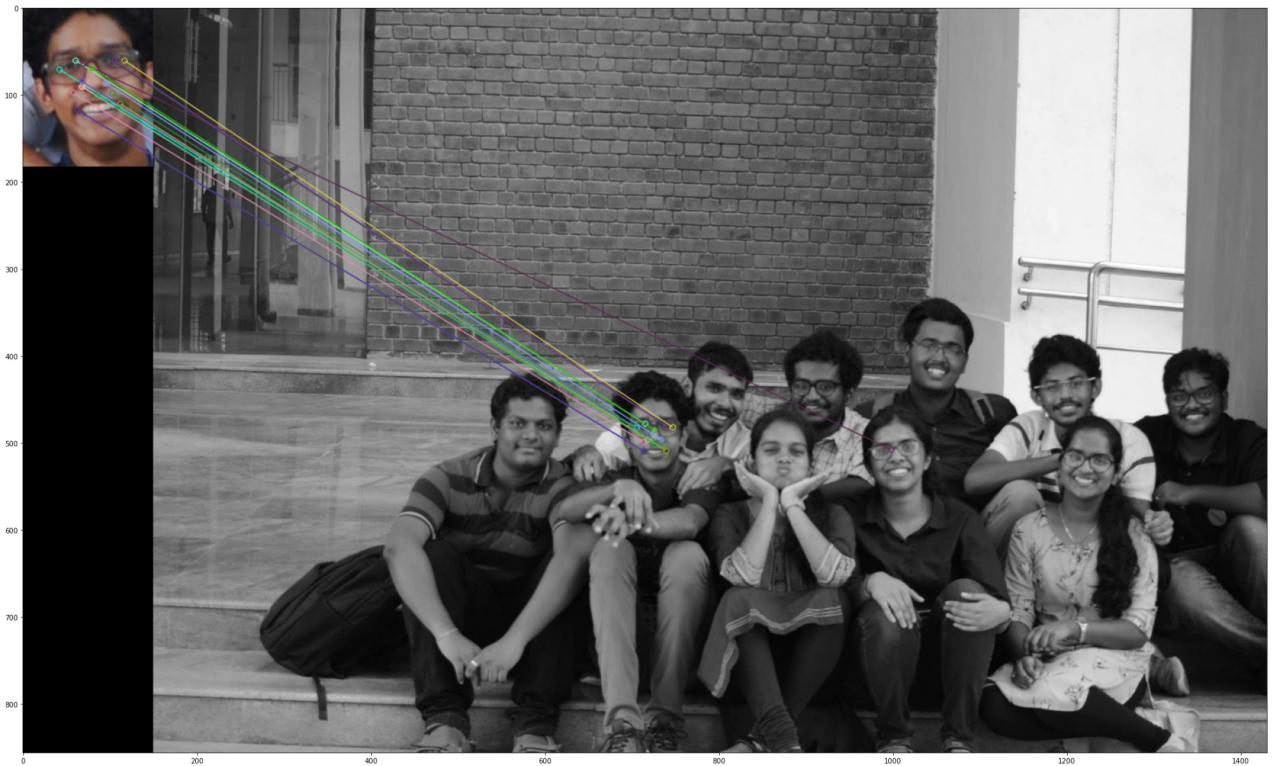




In [18]: `face_recog_sift('grp2.jpeg','subs.jpeg')`

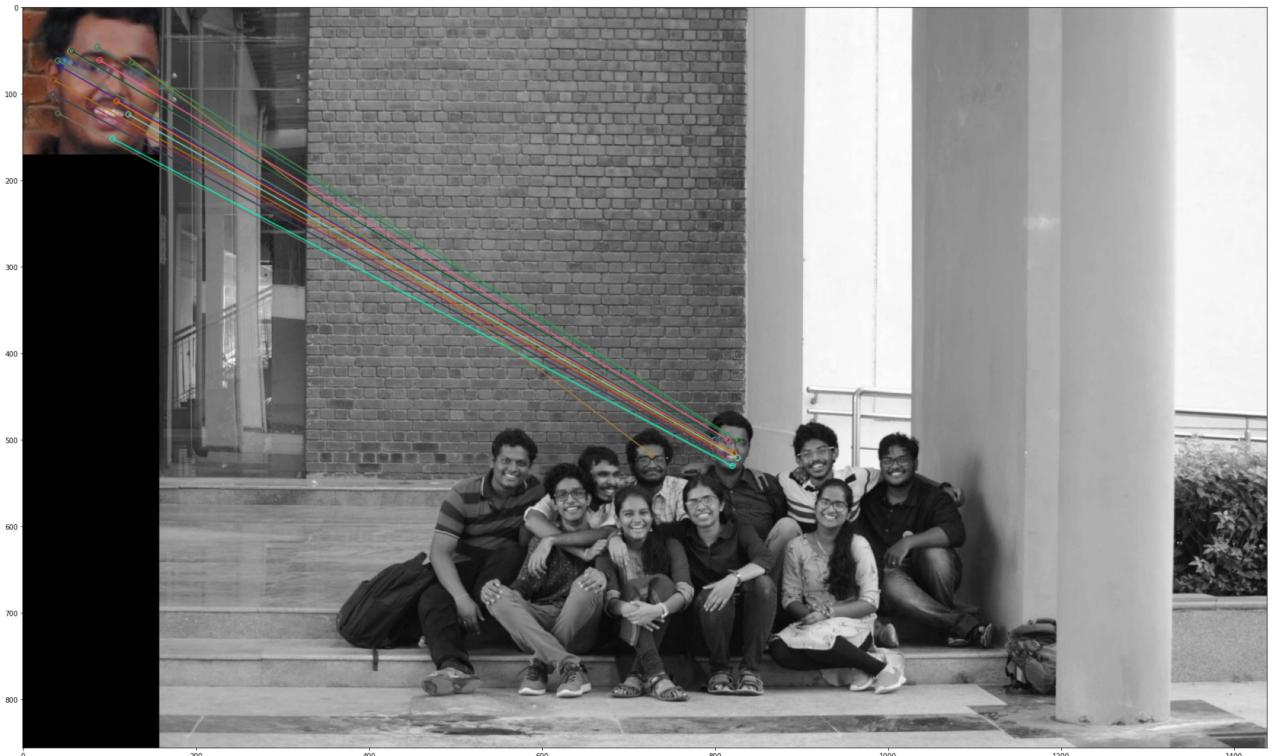
Number of Keypoints Detected In The Training Image: 124
Number of Keypoints Detected In The Query Image: 4396

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```
In [19]: face_recog_sift('grp1.jpeg','harish.jpeg')
```

Number of Keypoints Detected In The Training Image: 86
Number of Keypoints Detected In The Query Image: 4287



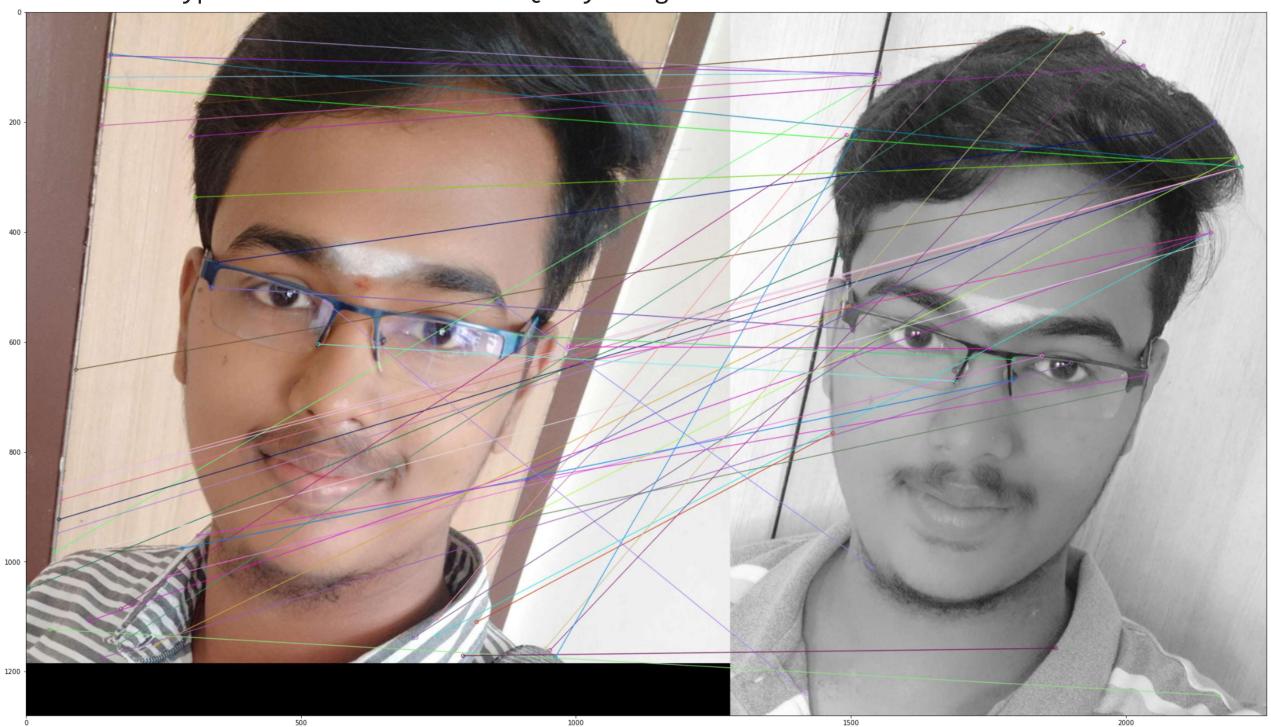
```
In [20]: face_recog_sift('grp3.jpeg','harish.jpeg')
```

Number of Keypoints Detected In The Training Image: 86
Number of Keypoints Detected In The Query Image: 7211
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```
In [21]: face_recog_sift('harish2.jpeg','harish3.jpeg')
```

Number of Keypoints Detected In The Training Image: 1608
Number of Keypoints Detected In The Query Image: 1179



```
In [22]: face_recog_sift('grp1.jpeg','sindu2.jpeg')
```

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Number of Keypoints Detected In The Training Image: 60

Number of Keypoints Detected In The Query Image: 4287



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