In [ ]:
```
pip install tf_keras, deepface
```

```
Defaulting to user installation because normal site-packages is not writea
ble
ERROR: Invalid requirement: 'tf_keras,'
WARNING: You are using pip version 21.2.3; however, version 24.0 is availa
ble.
You should consider upgrading via the '/usr/local/bin/python3.10 -m pip in
stall --upgrade pip' command.
Note: you may need to restart the kernel to use updated packages.
```

In [ ]:
```
from deepface import DeepFace
detector_backends = [ 'opencv', 'retinaface',
        'mtcnn', 'ssd', 'dlib', 'mediapipe', 'yolov8', 'centerface'] # or
```

```
2024-05-29 10:45:16.090453: I tensorflow/core/util/port.cc:113] oneDNN cus
tom operations are on. You may see slightly different numerical results du
e to floating-point round-off errors from different computation orders. To
turn them off, set the environment variable `TF_ENABLE_ONEDNN_OPTS=0`.
2024-05-29 10:45:16.155646: I tensorflow/core/platform/cpu_feature_guard.c
c:210] This TensorFlow binary is optimized to use available CPU instructio
ns in performance-critical operations.
To enable the following instructions: AVX2 AVX_VNNI FMA, in other operatio
ns, rebuild TensorFlow with the appropriate compiler flags.
2024-05-29 10:45:17.426428: W tensorflow/compiler/tf2tensorrt/utils/py_uti
ls.cc:38] TF-TRT Warning: Could not find TensorRT
```

In [ ]:
```
faces=DeepFace.extract_faces("img1.jpg")
faces
```

Out[ ]:
```
[{'face': array([[[0.23529412, 0.27058825, 0.3372549 ],
                  [0.24705882, 0.2784314 , 0.34901962],
                  [0.28235295, 0.30588236, 0.38039216],
                  ...,
                  [0.09019608, 0.09019608, 0.12156863],
                  [0.09019608, 0.09019608, 0.12156863],
                  [0.09411765, 0.09411765, 0.1254902 ]],

                 [[0.22745098, 0.2627451 , 0.32941177],
                  [0.24313726, 0.27450982, 0.34117648],
                  [0.2784314 , 0.30588236, 0.3764706 ],
                  ...,
                  [0.09019608, 0.09019608, 0.12156863],
                  [0.09019608, 0.09019608, 0.1254902 ],
                  [0.09411765, 0.09411765, 0.1254902 ]],

                 [[0.20392157, 0.23921569, 0.30588236],
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                  [0.27450982, 0.3019608 , 0.37254903],
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                  [0.09411765, 0.09411765, 0.1254902 ],
                  [0.09411765, 0.09411765, 0.1254902 ]],

                 ...,

                 [[0.3372549 , 0.34509805, 0.42352942],
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                  [0.23529412, 0.24705882, 0.32156864],
                  ...,
                  [0.90588236, 0.6392157 , 0.4627451 ],
                  [0.9098039 , 0.6431373 , 0.46666667],
                  [0.9098039 , 0.6431373 , 0.46666667]],

                 [[0.34509805, 0.35686275, 0.43137255],
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                  [0.21176471, 0.22352941, 0.29803923],
                  ...,
                  [0.90588236, 0.6392157 , 0.4627451 ],
                  [0.9098039 , 0.6431373 , 0.46666667],
                  [0.9098039 , 0.6431373 , 0.46666667]],

                 [[0.34901962, 0.36078432, 0.43529412],
                  [0.30980393, 0.31764707, 0.39215687],
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                  ...,
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                  [0.9098039 , 0.6431373 , 0.46666667],
                  [0.9098039 , 0.6431373 , 0.46666667]]], dtype=float32),
  'facial_area': {'x': 17,
   'y': 38,
   'w': 101,
   'h': 101,
   'left_eye': None,
   'right_eye': None},
  'confidence': 0.96}]
```

In [ ]:
```
models = ["VGG-Face","Facenet","Facenet512","OpenFace","DeepFace","DeepID
#You can adjust the threshold according to your use case. Print the resul
#you can use any of the these models for verify and find methods for reco
```

```
from deepface import DeepFace
fr_result = DeepFace.verify("img1.jpg","img2.jpg")
print(fr_result)
```

```
{'verified': True, 'distance': 0.5945624695450326, 'threshold': 0.68, 'mod
el': 'VGG-Face', 'detector_backend': 'opencv', 'similarity_metric': 'cosin
e', 'facial_areas': {'img1': {'x': 17, 'y': 38, 'w': 101, 'h': 101, 'left_
eye': None, 'right_eye': None}, 'img2': {'x': 55, 'y': 36, 'w': 67, 'h': 6
7, 'left_eye': None, 'right_eye': None}}, 'time': 0.8}
```

In [ ]:
```
dfs = DeepFace.find(
  img_path = "img1.jpg",
  db_path = "db"
)
print(dfs) #you can print the result to see the distance values
```

```
24-05-29 10:51:50 - Found 1 newly added image(s), 0 removed image(s), 0 re
placed image(s).
Finding representations: 100%|██████████| 1/1 [00:00<00:00,  2.62it/s]
24-05-29 10:51:50 - There are now 1 representations in ds_vggface_opencv_v
2.pkl
24-05-29 10:51:50 - Searching img1.jpg in 1 length datastore
24-05-29 10:51:51 - find function duration 0.7952396869659424 seconds
[      identity                                    hash  target_x  targe
t_y  \
0  db/img2.jpg  22aa7ee15d5acb5cf36d04b8ffe68149fd76f992        55
36

   target_w  target_h  source_x  source_y  source_w  source_h  threshold
\
0        67        67        17        38       101       101       0.68

   distance
0  0.594562  ]
```

In [ ]:
```
#Facial Analysis
objs = DeepFace.analyze(
  img_path = "img1.jpg",
  actions = ['age', 'gender', 'race', 'emotion'],
)
print(objs)
```

```
Action: age:   0%|          | 0/4 [00:00<?, ?it/s]
Action: emotion: 100%|██████████| 4/4 [00:01<00:00,  3.42it/s]
[{'age': 32, 'region': {'x': 17, 'y': 38, 'w': 101, 'h': 101, 'left_eye':
None, 'right_eye': None}, 'face_confidence': 0.96, 'gender': {'Woman': 99.
89277720451355, 'Man': 0.10722607839852571}, 'dominant_gender': 'Woman', '
race': {'asian': 0.31468248926103115, 'indian': 2.345060743391514, 'black'
: 0.10292140068486333, 'white': 45.818862318992615, 'middle eastern': 31.9
7084665298462, 'latino hispanic': 19.447627663612366}, 'dominant_race': 'w
hite', 'emotion': {'angry': 0.048330915219749186, 'disgust': 5.16879533063
9883e-08, 'fear': 0.04037788704189515, 'happy': 0.10273390156222563, 'sad'
: 0.07271875808201633, 'surprise': 5.565872716460882e-05, 'neutral': 99.73
577860167282}, 'dominant_emotion': 'neutral'}]
```

In [ ]:
```
#Facial Embeddings
embedding_objs = DeepFace.represent(
  img_path = "img1.jpg",
  model_name = models[2],
)
```

```
#These can be used for clustering, finding similarity between faces, vect
embedding_objs
```

Out[ ]:

```
[{'embedding': [0.025623973459005356,
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```

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