```
!pip install retina-face
```

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```

```
import cv2
from retinaface import RetinaFace
# Load the image
image_path = '/content/bti.jpg'  # Replace with the path to your image
image = cv2.imread(image_path)
# Detect faces in the image
faces = RetinaFace.detect_faces(image)

# Check if any face is detected
if len(faces) == 0:
    print("No face detected.")
else:
    print(f"Detected {len(faces)} face(s).")

# Extract the face based on
#the detected bounding box
for key, face in faces.items():
    # Get bounding box coordinates
    facial_area = face['facial_area']
    x1, y1, x2, y2 = facial_area

    # Crop the face from the image
    extracted_face = image[y1:y2, x1:x2]

    # Save the extracted face
    output_path = 'extracted_face_dlb.jpg'
    cv2.imwrite(output_path, extracted_face)
    print(f"Face extracted and saved at {output_path}.")

    # Optional: Display the extracted face
```

xtracted_face.jpg extracted_face.jpg.jpg ×

```
    # cv2.imshow("Extracted Face", extracted_face)
    cv2.waitKey(0)
    cv2.destroyAllWindows()
```

```
No face detected.
```

```
import cv2
import numpy as np
from insightface.app import FaceAnalysis

# Step 1: Initialize and prepare the ArcFace model
app = FaceAnalysis(providers=['CUDAExecutionProvider', 'CPUExecutionProvider'])  # Us
app.prepare(ctx_id=0, det_size=(640, 640))  # ctx_id=0 uses GPU; -1 uses CPU

def preprocess_image(image):
    """
    Preprocess the image by resizing and normalizing it to match the model's input re
    """
    # Resize image to the model's expected input size (112x112 for ArcFace)
    resized_image = cv2.resize(image, (112, 112))

    # Normalize the image: scale pixel values to the range [0, 1]
    normalized_image = resized_image.astype(np.float32) / 255.0

    # Convert the image to RGB format (OpenCV loads images in BGR format)
    rgb_image = cv2.cvtColor(normalized_image, cv2.COLOR_BGR2RGB)

    return rgb_image

def extract_features(image_path):
    """
    Extracts face embeddings from an image using the ArcFace model.
    """
    # Load the image
    image = cv2.imread(image_path)
    if image is None:
        print("Error: Image not loaded. Please check the path.")
        return None

    # Preprocess the image (resize and normalize)

    preprocessed_image = preprocess_image(image)
    output_path = f'{image_path}.jpg'
    cv2.imwrite(output_path, preprocessed_image)

    # Detect faces in the preprocessed image
    faces = app.get(preprocessed_image)
    if len(faces) != 1:
        print(f"Expected 1 face, but found {len(faces)} face(s).")
        return None

    # Extract the face embedding (feature vector)
    embedding = faces[0].embedding
    return embedding

def compare_faces(embedding1, embedding2):
    """
    Compares two face embeddings using cosine similarity.
    """
    # Compute cosine similarity
    similarity = np.dot(embedding1, embedding2) / (np.linalg.norm(embedding1) * np.li
    return similarity

# Provide paths to the two face images
image_path_1 = '/content/Rohan-pic.jpg'  # Path to the first face image
image_path_2 = '/content/Rohan-pic.jpg'         # Path to the second face image

# Step 2: Extract features from both images
embedding1 = extract_features(image_path_1)
embedding2 = extract_features(image_path_2)

# Step 3: Compare the embeddings if extraction was successful
if embedding1 is not None and embedding2 is not None:
    similarity_score = compare_faces(embedding1, embedding2)
    print(f"Similarity Score: {similarity_score}")

    # Define a threshold to determine if the faces match (usually around 0.5 - 0.6)
    threshold = 0.6
    if similarity_score > threshold:
        print(f"The faces match with a similarity score of {similarity_score:.4f}.")
```

```
    else:
        print(f"The faces do not match with a similarity score of {similarity_score:.
else:
    print("Feature extraction failed for one or both images.")
```

```
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set det-size: (640, 640)
Expected 1 face, but found 0 face(s).
Expected 1 face, but found 0 face(s).
Feature extraction failed for one or both images.
```

```
!pip install insightface
```

```
Collecting insightface
  Downloading insightface-0.7.3.tar.gz (439 kB)
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  Installing build dependencies ... done
  Getting requirements to build wheel ... done
  Preparing metadata (pyproject.toml) ... done
Requirement already satisfied: numpy in /usr/local/lib/python3.10/dist-packag
Collecting onnx (from insightface)
  Downloading onnx-1.16.2-cp310-cp310-manylinux_2_17_x86_64.manylinux2014_x86
Requirement already satisfied: tqdm in /usr/local/lib/python3.10/dist-package
Requirement already satisfied: requests in /usr/local/lib/python3.10/dist-pac
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Requirement already satisfied: lazy-loader>=0.4 in /usr/local/lib/python3.10/
Requirement already satisfied: contourpy>=1.0.1 in /usr/local/lib/python3.10/
Requirement already satisfied: cycler>=0.10 in /usr/local/lib/python3.10/dist
Requirement already satisfied: fonttools>=4.22.0 in /usr/local/lib/python3.10
Requirement already satisfied: kiwisolver>=1.0.1 in /usr/local/lib/python3.10
Requirement already satisfied: pyparsing>=2.3.1 in /usr/local/lib/python3.10/
Requirement already satisfied: python-dateutil>=2.7 in /usr/local/lib/python3
Requirement already satisfied: protobuf>=3.20.2 in /usr/local/lib/python3.10/
Requirement already satisfied: wcwidth in /usr/local/lib/python3.10/dist-pack
Requirement already satisfied: charset-normalizer<4,>=2 in /usr/local/lib/pyt
Requirement already satisfied: idna<4,>=2.5 in /usr/local/lib/python3.10/dist
Requirement already satisfied: urllib3<3,>=1.21.1 in /usr/local/lib/python3.1
Requirement already satisfied: certifi>=2017.4.17 in /usr/local/lib/python3.1
Requirement already satisfied: joblib>=1.2.0 in /usr/local/lib/python3.10/dis
Requirement already satisfied: threadpoolctl>=3.1.0 in /usr/local/lib/python3
Requirement already satisfied: annotated-types>=0.6.0 in /usr/local/lib/pythc
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Requirement already satisfied: typing-extensions>=4.6.1 in /usr/local/lib/pyt
Requirement already satisfied: six>=1.5 in /usr/local/lib/python3.10/dist-pac
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Building wheels for collected packages: insightface
  Building wheel for insightface (pyproject.toml) ... done
  Created wheel for insightface: filename=insightface-0.7.3-cp310-cp310-linux
  Stored in directory: /root/.cache/pip/wheels/e3/d0/80/e3773fb8b6d1cca87ea1c
Successfully built insightface
Installing collected packages: onnx, insightface
Successfully installed insightface-0.7.3 onnx-1.16.2
```

```
!pip install onnxruntime
```

```
Collecting onnxruntime
  Downloading onnxruntime-1.19.2-cp310-cp310-manylinux_2_27_x86_64.manylinux_2_
```

```
Collecting coloredlogs (from onnxruntime)
  Downloading coloredlogs-15.0.1-py2.py3-none-any.whl.metadata (12 kB)
Requirement already satisfied: flatbuffers in /usr/local/lib/python3.10/dist-pa
Requirement already satisfied: numpy>=1.21.6 in /usr/local/lib/python3.10/dist-
Requirement already satisfied: packaging in /usr/local/lib/python3.10/dist-packa
Requirement already satisfied: protobuf in /usr/local/lib/python3.10/dist-packa
Requirement already satisfied: sympy in /usr/local/lib/python3.10/dist-packages
Collecting humanfriendly>=9.1 (from coloredlogs->onnxruntime)
  Downloading humanfriendly-10.0-py2.py3-none-any.whl.metadata (9.2 kB)
Requirement already satisfied: mpmath<1.4,>=1.1.0 in /usr/local/lib/python3.10/
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Downloading humanfriendly-10.0-py2.py3-none-any.whl (86 kB)
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Installing collected packages: humanfriendly, coloredlogs, onnxruntime
Successfully installed coloredlogs-15.0.1 humanfriendly-10.0 onnxruntime-1.19.2
```

```
import cv2
import numpy as np
from keras.models import load_model
from keras.preprocessing import image

# Load the pre-trained FaceNet model
model = load_model('/content/facenet_keras.h5')

def preprocess_image(img_path):
    # Load the image
    img = cv2.imread(img_path)
    img = cv2.cvtColor(img, cv2.COLOR_BGR2RGB)  # Convert BGR to RGB
    img = cv2.resize(img, (160, 160))  # Resize to 160x160
    img = img.astype('float32')
    img = img / 255.0  # Normalize the image
    img = np.expand_dims(img, axis=0)  # Add batch dimension
    return img

def get_embedding(img_path):
    # Preprocess the image and get the embedding
    preprocessed_image = preprocess_image(img_path)
    embedding = model.predict(preprocessed_image)
    return embedding

def compare_faces(embedding1, embedding2, threshold=0.5):
    # Calculate the Euclidean distance between the embeddings
    distance = np.linalg.norm(embedding1 - embedding2)
    print(f'Distance: {distance}')

    if distance < threshold:
        print("The faces match.")
    else:
        print("The faces do not match.")

# Provide paths to the two face images
image_path_1 = 'path_to_image_1.jpg'  # Path to the first face image
image_path_2 = 'path_to_image_2.jpg'  # Path to the second face image

# Get embeddings for both images
embedding1 = get_embedding(image_path_1)
embedding2 = get_embedding(image_path_2)

# Compare the two embeddings
compare_faces(embedding1, embedding2)
```

```
---------------------------------------------------------------------------
ValueError                                Traceback (most recent call last)
<ipython-input-27-3b95505f3d0f> in <cell line: 7>()
      5
      6 # Load the pre-trained FaceNet model
----> 7 model = load_model('/content/facenet_keras.h5')
      8
      9 def preprocess_image(img_path):

                                 10 frames
/usr/local/lib/python3.10/dist-packages/keras/src/utils/python_utils.py in
func_load(code, defaults, closure, globs)

ValueError: bad marshal data (unknown type code)
```

Next steps: Explain error

```
import os
print(os.path.exists('/content/facenet_keras.h5'))
```

```
True
```

```
!pip install keras==2.4.3
!pip install tensorflow==2.4.1
```

```
Requirement already satisfied: keras==2.4.3 in /usr/local/lib/python3.10/dist-pa
Requirement already satisfied: numpy>=1.9.1 in /usr/local/lib/python3.10/dist-pa
Requirement already satisfied: scipy>=0.14 in /usr/local/lib/python3.10/dist-pac
Requirement already satisfied: pyyaml in /usr/local/lib/python3.10/dist-packages
Requirement already satisfied: h5py in /usr/local/lib/python3.10/dist-packages
ERROR: Could not find a version that satisfies the requirement tensorflow==2.4.1
ERROR: No matching distribution found for tensorflow==2.4.1
```

Start coding or generate with AI.