

HW 14 Report Minh Nguyen

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In [1]: !pip install deepface  
!pip install retina-face  
!pip install tf_keras
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Requirement already satisfied: deepface in /Users/ndminh/miniconda3/lib/python3.12/site-packages (0.0.93)

Requirement already satisfied: requests>=2.27.1 in /Users/ndminh/miniconda3/lib/python3.12/site-packages (from deepface) (2.32.3)

Requirement already satisfied: numpy>=1.14.0 in /Users/ndminh/miniconda3/lib/python3.12/site-packages (from deepface) (1.26.4)

Requirement already satisfied: pandas>=0.23.4 in /Users/ndminh/miniconda3/lib/python3.12/site-packages (from deepface) (2.2.3)

Requirement already satisfied: gdown>=3.10.1 in /Users/ndminh/miniconda3/lib/python3.12/site-packages (from deepface) (5.2.0)

Requirement already satisfied: tqdm>=4.30.0 in /Users/ndminh/miniconda3/lib/python3.12/site-packages (from deepface) (4.66.5)

Requirement already satisfied: Pillow>=5.2.0 in /Users/ndminh/miniconda3/lib/python3.12/site-packages (from deepface) (11.0.0)

Requirement already satisfied: opencv-python>=4.5.5.64 in /Users/ndminh/miniconda3/lib/python3.12/site-packages (from deepface) (4.11.0.86)

Requirement already satisfied: tensorflow>=1.9.0 in /Users/ndminh/miniconda3/lib/python3.12/site-packages (from deepface) (2.17.0)

Requirement already satisfied: keras>=2.2.0 in /Users/ndminh/miniconda3/lib/python3.12/site-packages (from deepface) (3.6.0)

Requirement already satisfied: Flask>=1.1.2 in /Users/ndminh/miniconda3/lib/python3.12/site-packages (from deepface) (3.1.0)

Requirement already satisfied: flask-cors>=4.0.1 in /Users/ndminh/miniconda3/lib/python3.12/site-packages (from deepface) (5.0.1)

Requirement already satisfied: mtcnn>=0.1.0 in /Users/ndminh/miniconda3/lib/python3.12/site-packages (from deepface) (1.0.0)

Requirement already satisfied: retina-face>=0.0.1 in /Users/ndminh/miniconda3/lib/python3.12/site-packages (from deepface) (0.0.17)

Requirement already satisfied: fire>=0.4.0 in /Users/ndminh/miniconda3/lib/python3.12/site-packages (from deepface) (0.7.0)

Requirement already satisfied: gunicorn>=20.1.0 in /Users/ndminh/miniconda3/lib/python3.12/site-packages (from deepface) (23.0.0)

Requirement already satisfied: termcolor in /Users/ndminh/miniconda3/lib/python3.12/site-packages (from fire>=0.4.0->deepface) (2.1.0)

Requirement already satisfied: Werkzeug>=3.1 in /Users/ndminh/miniconda3/lib/python3.12/site-packages (from Flask>=1.1.2->deepface) (3.1.3)

Requirement already satisfied: Jinja2>=3.1.2 in /Users/ndminh/miniconda3/lib/python3.12/site-packages (from Flask>=1.1.2->deepface) (3.1.4)

Requirement already satisfied: itsdangerous>=2.2 in /Users/ndminh/miniconda3/lib/python3.12/site-packages (from Flask>=1.1.2->deepface) (2.2.0)

Requirement already satisfied: click>=8.1.3 in /Users/ndminh/miniconda3/lib/python3.12/site-packages (from Flask>=1.1.2->deepface) (8.1.7)

Requirement already satisfied: blinker>=1.9 in /Users/ndminh/miniconda3/lib/python3.12/site-packages (from Flask>=1.1.2->deepface) (1.9.0)

Requirement already satisfied: beautifulsoup4 in /Users/ndminh/miniconda3/lib/python3.12/site-packages (from gdown>=3.10.1->deepface) (4.12.3)

Requirement already satisfied: filelock in /Users/ndminh/miniconda3/lib/python3.12/site-packages (from gdown>=3.10.1->deepface) (3.13.1)

Requirement already satisfied: packaging in /Users/ndminh/miniconda3/lib/python3.12/site-packages (from gunicorn>=20.1.0->deepface) (24.1)

Requirement already satisfied: absl-py in /Users/ndminh/miniconda3/lib/python3.12/site-packages (from keras>=2.2.0->deepface) (2.1.0)

Requirement already satisfied: rich in /Users/ndminh/miniconda3/lib/python3.12/site-packages (from keras>=2.2.0->deepface) (13.9.4)

Requirement already satisfied: namex in /Users/ndminh/miniconda3/lib/python3.12/site-packages (from keras>=2.2.0->deepface) (0.0.7)

Requirement already satisfied: h5py in /Users/ndminh/miniconda3/lib/python3.12/site-packages (from keras>=2.2.0->deepface) (3.12.1)

Requirement already satisfied: optree in /Users/ndminh/miniconda3/lib/python3.12/site-packages (from keras>=2.2.0->deepface) (0.12.1)

Requirement already satisfied: ml-dtypes in /Users/ndminh/miniconda3/lib/python3.12/site-packages (from keras>=2.2.0->deepface) (0.4.0)

Requirement already satisfied: joblib>=1.4.2 in /Users/ndminh/miniconda3/lib/python3.12/site-packages (from mtcnn>=0.1.0->deepface) (1.4.2)

Requirement already satisfied: lz4>=4.3.3 in /Users/ndminh/miniconda3/lib/python3.12/site-packages (from mtcnn>=0.1.0->deepface) (4.4.3)

Requirement already satisfied: python-dateutil>=2.8.2 in /Users/ndminh/miniconda3/lib/python3.12/site-packages (from pandas>=0.23.4->deepface) (2.9.0.post0)

Requirement already satisfied: pytz>=2020.1 in /Users/ndminh/miniconda3/lib/python3.12/site-packages (from pandas>=0.23.4->deepface) (2024.1)

Requirement already satisfied: tzdata>=2022.7 in /Users/ndminh/miniconda3/lib/python3.12/site-packages (from pandas>=0.23.4->deepface) (2023.3)

Requirement already satisfied: charset-normalizer<4,>=2 in /Users/ndminh/miniconda3/lib/python3.12/site-packages (from requests>=2.27.1->deepface) (3.3.2)

Requirement already satisfied: idna<4,>=2.5 in /Users/ndminh/miniconda3/lib/python3.12/site-packages (from requests>=2.27.1->deepface) (3.7)

Requirement already satisfied: urllib3<3,>=1.21.1 in /Users/ndminh/miniconda3/lib/python3.12/site-packages (from requests>=2.27.1->deepface) (2.2.3)

Requirement already satisfied: certifi>=2017.4.17 in /Users/ndminh/miniconda3/lib/python3.12/site-packages (from requests>=2.27.1->deepface) (2025.1.31)

Requirement already satisfied: astunparse>=1.6.0 in /Users/ndminh/miniconda3/lib/python3.12/site-packages (from tensorflow>=1.9.0->deepface) (1.6.3)

Requirement already satisfied: flatbuffers>=24.3.25 in /Users/ndminh/miniconda3/lib/python3.12/site-packages (from tensorflow>=1.9.0->deepface) (24.3.25)

Requirement already satisfied: gast!=0.5.0,!0.5.1,!0.5.2,>=0.2.1 in /Users/ndminh/miniconda3/lib/python3.12/site-packages (from tensorflow>=1.9.0->deepface) (0.5.3)

Requirement already satisfied: google-pasta>=0.1.1 in /Users/ndminh/miniconda3/lib/python3.12/site-packages (from tensorflow>=1.9.0->deepface) (0.2.0)

Requirement already satisfied: opt-einsum>=2.3.2 in /Users/ndminh/miniconda3/lib/python3.12/site-packages (from tensorflow>=1.9.0->deepface) (3.3.0)

Requirement already satisfied: protobuf!=4.21.0,!4.21.1,!4.21.2,!4.21.3,!4.21.4,!4.21.5,<5.0.0dev,>=3.20.3 in /Users/ndminh/miniconda3/lib/python3.12/site-packages (from tensorflow>=1.9.0->deepface) (4.25.3)

Requirement already satisfied: setuptools in /Users/ndminh/miniconda3/lib/python3.12/site-packages (from tensorflow>=1.9.0->deepface) (75.1.0)

Requirement already satisfied: six>=1.12.0 in /Users/ndminh/miniconda3/lib/python3.12/site-packages (from tensorflow>=1.9.0->deepface) (1.16.0)

Requirement already satisfied: typing-extensions>=3.6.6 in /Users/ndminh/miniconda3/lib/python3.12/site-packages (from tensorflow>=1.9.0->deepface) (4.12.2)

Requirement already satisfied: wrapt>=1.11.0 in /Users/ndminh/miniconda3/lib/python3.12/site-packages (from tensorflow>=1.9.0->deepface) (1.17.0)

Requirement already satisfied: grpcio<2.0,>=1.24.3 in /Users/ndminh/miniconda3/lib/python3.12/site-packages (from tensorflow>=1.9.0->deepface) (1.62.2)

Requirement already satisfied: tensorboard<2.18,>=2.17 in /Users/ndminh/miniconda3/lib/python3.12/site-packages (from tensorflow>=1.9.0->deepface) (2.17.0)

Requirement already satisfied: wheel<1.0,>=0.23.0 in /Users/ndminh/miniconda

3/lib/python3.12/site-packages (from astunparse>=1.6.0->tensorflow>=1.9.0->deepface) (0.44.0)

Requirement already satisfied: MarkupSafe>=2.0 in /Users/ndminh/miniconda3/lib/python3.12/site-packages (from Jinja2>=3.1.2->Flask>=1.1.2->deepface) (2.1.3)

Requirement already satisfied: markdown>=2.6.8 in /Users/ndminh/miniconda3/lib/python3.12/site-packages (from tensorboard<2.18,>=2.17->tensorflow>=1.9.0->deepface) (3.4.1)

Requirement already satisfied: tensorboard-data-server<0.8.0,>=0.7.0 in /Users/ndminh/miniconda3/lib/python3.12/site-packages (from tensorboard<2.18,>=2.17->tensorflow>=1.9.0->deepface) (0.7.0)

Requirement already satisfied: soupsieve>1.2 in /Users/ndminh/miniconda3/lib/python3.12/site-packages (from beautifulsoup4->gdown>=3.10.1->deepface) (2.5)

Requirement already satisfied: PySocks!=1.5.7,>=1.5.6 in /Users/ndminh/miniconda3/lib/python3.12/site-packages (from requests[socks]->gdown>=3.10.1->deepface) (1.7.1)

Requirement already satisfied: markdown-it-py>=2.2.0 in /Users/ndminh/miniconda3/lib/python3.12/site-packages (from rich->keras>=2.2.0->deepface) (2.2.0)

Requirement already satisfied: pygments<3.0.0,>=2.13.0 in /Users/ndminh/miniconda3/lib/python3.12/site-packages (from rich->keras>=2.2.0->deepface) (2.15.1)

Requirement already satisfied: mdurl~=0.1 in /Users/ndminh/miniconda3/lib/python3.12/site-packages (from markdown-it-py>=2.2.0->rich->keras>=2.2.0->deepface) (0.1.0)

Requirement already satisfied: retina-face in /Users/ndminh/miniconda3/lib/python3.12/site-packages (0.0.17)

Requirement already satisfied: numpy>=1.14.0 in /Users/ndminh/miniconda3/lib/python3.12/site-packages (from retina-face) (1.26.4)

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Requirement already satisfied: opencv-python>=3.4.4 in /Users/ndminh/miniconda3/lib/python3.12/site-packages (from retina-face) (4.11.0.86)

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Requirement already satisfied: requests[socks] in /Users/ndminh/miniconda3/lib/python3.12/site-packages (from gdown>=3.10.1->retina-face) (2.32.3)

Requirement already satisfied: tqdm in /Users/ndminh/miniconda3/lib/python3.12/site-packages (from gdown>=3.10.1->retina-face) (4.66.5)

Requirement already satisfied: absl-py>=1.0.0 in /Users/ndminh/miniconda3/lib/python3.12/site-packages (from tensorflow>=1.9.0->retina-face) (2.1.0)

Requirement already satisfied: astunparse>=1.6.0 in /Users/ndminh/miniconda3/lib/python3.12/site-packages (from tensorflow>=1.9.0->retina-face) (1.6.3)

Requirement already satisfied: flatbuffers>=24.3.25 in /Users/ndminh/miniconda3/lib/python3.12/site-packages (from tensorflow>=1.9.0->retina-face) (24.3.25)

Requirement already satisfied: gast!=0.5.0,!0.5.1,!0.5.2,>=0.2.1 in /Users/ndminh/miniconda3/lib/python3.12/site-packages (from tensorflow>=1.9.0->retina-face) (0.5.3)

Requirement already satisfied: google-pasta>=0.1.1 in /Users/ndminh/miniconda3/lib/python3.12/site-packages (from tensorflow>=1.9.0->retina-face) (0.2.0)

Requirement already satisfied: h5py>=3.10.0 in /Users/ndminh/miniconda3/lib/python3.12/site-packages (from tensorflow>=1.9.0->retina-face) (3.12.1)

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Requirement already satisfied: opt-einsum>=2.3.2 in /Users/ndminh/miniconda3/lib/python3.12/site-packages (from tensorflow>=1.9.0->retina-face) (3.3.0)

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Requirement already satisfied: protobuf!=4.21.0,!4.21.1,!4.21.2,!4.21.3,!4.21.4,!4.21.5,<5.0.0dev,>=3.20.3 in /Users/ndminh/miniconda3/lib/python3.12/site-packages (from tensorflow>=1.9.0->retina-face) (4.25.3)

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Requirement already satisfied: wrapt>=1.11.0 in /Users/ndminh/miniconda3/lib/python3.12/site-packages (from tensorflow>=1.9.0->retina-face) (1.17.0)

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Requirement already satisfied: keras>=3.2.0 in /Users/ndminh/miniconda3/lib/python3.12/site-packages (from tensorflow>=1.9.0->retina-face) (3.6.0)

Requirement already satisfied: wheel<1.0,>=0.23.0 in /Users/ndminh/miniconda3/lib/python3.12/site-packages (from astunparse>=1.6.0->tensorflow>=1.9.0->retina-face) (0.44.0)

Requirement already satisfied: rich in /Users/ndminh/miniconda3/lib/python3.12/site-packages (from keras>=3.2.0->tensorflow>=1.9.0->retina-face) (13.9.4)

Requirement already satisfied: namex in /Users/ndminh/miniconda3/lib/python3.12/site-packages (from keras>=3.2.0->tensorflow>=1.9.0->retina-face) (0.0.7)

Requirement already satisfied: optree in /Users/ndminh/miniconda3/lib/python3.12/site-packages (from keras>=3.2.0->tensorflow>=1.9.0->retina-face) (0.12.1)

Requirement already satisfied: charset-normalizer<4,>=2 in /Users/ndminh/miniconda3/lib/python3.12/site-packages (from requests[socks]->gdown>=3.10.1->retina-face) (3.3.2)

Requirement already satisfied: idna<4,>=2.5 in /Users/ndminh/miniconda3/lib/python3.12/site-packages (from requests[socks]->gdown>=3.10.1->retina-face) (3.7)

Requirement already satisfied: urllib3<3,>=1.21.1 in /Users/ndminh/miniconda3/lib/python3.12/site-packages (from requests[socks]->gdown>=3.10.1->retina-face) (2.2.3)

Requirement already satisfied: certifi>=2017.4.17 in /Users/ndminh/miniconda

3/lib/python3.12/site-packages (from requests[socks]->gdown>=3.10.1->retina-face) (2025.1.31)

Requirement already satisfied: markdown>=2.6.8 in /Users/ndminh/miniconda3/lib/python3.12/site-packages (from tensorboard<2.18,>=2.17->tensorflow>=1.9.0->retina-face) (3.4.1)

Requirement already satisfied: tensorboard-data-server<0.8.0,>=0.7.0 in /Users/ndminh/miniconda3/lib/python3.12/site-packages (from tensorboard<2.18,>=2.17->tensorflow>=1.9.0->retina-face) (0.7.0)

Requirement already satisfied: werkzeug>=1.0.1 in /Users/ndminh/miniconda3/lib/python3.12/site-packages (from tensorboard<2.18,>=2.17->tensorflow>=1.9.0->retina-face) (3.1.3)

Requirement already satisfied: soupsieve>1.2 in /Users/ndminh/miniconda3/lib/python3.12/site-packages (from beautifulsoup4->gdown>=3.10.1->retina-face) (2.5)

Requirement already satisfied: PySocks!=1.5.7,>=1.5.6 in /Users/ndminh/miniconda3/lib/python3.12/site-packages (from requests[socks]->gdown>=3.10.1->retina-face) (1.7.1)

Requirement already satisfied: MarkupSafe>=2.1.1 in /Users/ndminh/miniconda3/lib/python3.12/site-packages (from werkzeug>=1.0.1->tensorboard<2.18,>=2.17->tensorflow>=1.9.0->retina-face) (2.1.3)

Requirement already satisfied: markdown-it-py>=2.2.0 in /Users/ndminh/miniconda3/lib/python3.12/site-packages (from rich->keras>=3.2.0->tensorflow>=1.9.0->retina-face) (2.2.0)

Requirement already satisfied: pygments<3.0.0,>=2.13.0 in /Users/ndminh/miniconda3/lib/python3.12/site-packages (from rich->keras>=3.2.0->tensorflow>=1.9.0->retina-face) (2.15.1)

Requirement already satisfied: mdurl~=0.1 in /Users/ndminh/miniconda3/lib/python3.12/site-packages (from markdown-it-py>=2.2.0->rich->keras>=3.2.0->tensorflow>=1.9.0->retina-face) (0.1.0)

Collecting tf_keras

 Downloading tf_keras-2.19.0-py3-none-any.whl.metadata (1.8 kB)

Collecting tensorflow<2.20,>=2.19 (from tf_keras)

 Downloading tensorflow-2.19.0-cp312-cp312-macosx_12_0_arm64.whl.metadata (4.0 kB)

Requirement already satisfied: absl-py>=1.0.0 in /Users/ndminh/miniconda3/lib/python3.12/site-packages (from tensorflow<2.20,>=2.19->tf_keras) (2.1.0)

Requirement already satisfied: astunparse>=1.6.0 in /Users/ndminh/miniconda3/lib/python3.12/site-packages (from tensorflow<2.20,>=2.19->tf_keras) (1.6.3)

Requirement already satisfied: flatbuffers>=24.3.25 in /Users/ndminh/miniconda3/lib/python3.12/site-packages (from tensorflow<2.20,>=2.19->tf_keras) (24.3.25)

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Requirement already satisfied: google-pasta>=0.1.1 in /Users/ndminh/miniconda3/lib/python3.12/site-packages (from tensorflow<2.20,>=2.19->tf_keras) (0.2.0)

Collecting libclang>=13.0.0 (from tensorflow<2.20,>=2.19->tf_keras)

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Requirement already satisfied: opt-einsum>=2.3.2 in /Users/ndminh/miniconda3/lib/python3.12/site-packages (from tensorflow<2.20,>=2.19->tf_keras) (3.3.0)

Requirement already satisfied: packaging in /Users/ndminh/miniconda3/lib/python3.12/site-packages (from tensorflow<2.20,>=2.19->tf_keras) (24.1)

Requirement already satisfied: protobuf!=4.21.0,!4.21.1,!4.21.2,!4.21.3,!4.21.4,!4.21.5,<6.0.0dev,>=3.20.3 in /Users/ndminh/miniconda3/lib/python3.12/site-packages (from tensorflow<2.20,>=2.19->tf_keras) (4.25.3)

Requirement already satisfied: requests<3,>=2.21.0 in /Users/ndminh/miniconda3/lib/python3.12/site-packages (from tensorflow<2.20,>=2.19->tf_keras) (2.32.3)

Requirement already satisfied: setuptools in /Users/ndminh/miniconda3/lib/python3.12/site-packages (from tensorflow<2.20,>=2.19->tf_keras) (75.1.0)

Requirement already satisfied: six>=1.12.0 in /Users/ndminh/miniconda3/lib/python3.12/site-packages (from tensorflow<2.20,>=2.19->tf_keras) (1.16.0)

Requirement already satisfied: termcolor>=1.1.0 in /Users/ndminh/miniconda3/lib/python3.12/site-packages (from tensorflow<2.20,>=2.19->tf_keras) (2.1.0)

Requirement already satisfied: typing-extensions>=3.6.6 in /Users/ndminh/miniconda3/lib/python3.12/site-packages (from tensorflow<2.20,>=2.19->tf_keras) (4.12.2)

Requirement already satisfied: wrapt>=1.11.0 in /Users/ndminh/miniconda3/lib/python3.12/site-packages (from tensorflow<2.20,>=2.19->tf_keras) (1.17.0)

Requirement already satisfied: grpcio<2.0,>=1.24.3 in /Users/ndminh/miniconda3/lib/python3.12/site-packages (from tensorflow<2.20,>=2.19->tf_keras) (1.62.2)

Collecting tensorboard~2.19.0 (from tensorflow<2.20,>=2.19->tf_keras)

Downloading tensorboard-2.19.0-py3-none-any.whl.metadata (1.8 kB)

Requirement already satisfied: keras>=3.5.0 in /Users/ndminh/miniconda3/lib/python3.12/site-packages (from tensorflow<2.20,>=2.19->tf_keras) (3.6.0)

Requirement already satisfied: numpy<2.2.0,>=1.26.0 in /Users/ndminh/miniconda3/lib/python3.12/site-packages (from tensorflow<2.20,>=2.19->tf_keras) (1.26.4)

Requirement already satisfied: h5py>=3.11.0 in /Users/ndminh/miniconda3/lib/python3.12/site-packages (from tensorflow<2.20,>=2.19->tf_keras) (3.12.1)

Collecting ml-dtypes<1.0.0,>=0.5.1 (from tensorflow<2.20,>=2.19->tf_keras)

Downloading ml_dtypes-0.5.1-cp312-cp312-macosx_10_9_universal2.whl.metadata (21 kB)

Requirement already satisfied: wheel<1.0,>=0.23.0 in /Users/ndminh/miniconda3/lib/python3.12/site-packages (from astunparse>=1.6.0->tensorflow<2.20,>=2.19->tf_keras) (0.44.0)

Requirement already satisfied: rich in /Users/ndminh/miniconda3/lib/python3.12/site-packages (from keras>=3.5.0->tensorflow<2.20,>=2.19->tf_keras) (13.9.4)

Requirement already satisfied: namex in /Users/ndminh/miniconda3/lib/python3.12/site-packages (from keras>=3.5.0->tensorflow<2.20,>=2.19->tf_keras) (0.0.7)

Requirement already satisfied: optree in /Users/ndminh/miniconda3/lib/python3.12/site-packages (from keras>=3.5.0->tensorflow<2.20,>=2.19->tf_keras) (0.12.1)

Requirement already satisfied: charset-normalizer<4,>=2 in /Users/ndminh/miniconda3/lib/python3.12/site-packages (from requests<3,>=2.21.0->tensorflow<2.20,>=2.19->tf_keras) (3.3.2)

Requirement already satisfied: idna<4,>=2.5 in /Users/ndminh/miniconda3/lib/python3.12/site-packages (from requests<3,>=2.21.0->tensorflow<2.20,>=2.19->tf_keras) (3.7)

Requirement already satisfied: urllib3<3,>=1.21.1 in /Users/ndminh/miniconda3/lib/python3.12/site-packages (from requests<3,>=2.21.0->tensorflow<2.20,>=2.19->tf_keras) (2.2.3)

Requirement already satisfied: certifi>=2017.4.17 in /Users/ndminh/miniconda3/lib/python3.12/site-packages (from requests<3,>=2.21.0->tensorflow<2.20,>=2.19->tf_keras) (2025.1.31)

```

Requirement already satisfied: markdown>=2.6.8 in /Users/ndminh/miniconda3/lib/python3.12/site-packages (from tensorboard~=2.19.0->tensorflow<2.20,>=2.19->tf_keras) (3.4.1)
Requirement already satisfied: tensorboard-data-server<0.8.0,>=0.7.0 in /Users/ndminh/miniconda3/lib/python3.12/site-packages (from tensorboard~=2.19.0->tensorflow<2.20,>=2.19->tf_keras) (0.7.0)
Requirement already satisfied: werkzeug>=1.0.1 in /Users/ndminh/miniconda3/lib/python3.12/site-packages (from tensorboard~=2.19.0->tensorflow<2.20,>=2.19->tf_keras) (3.1.3)
Requirement already satisfied: MarkupSafe>=2.1.1 in /Users/ndminh/miniconda3/lib/python3.12/site-packages (from werkzeug>=1.0.1->tensorboard~=2.19.0->tensorflow<2.20,>=2.19->tf_keras) (2.1.3)
Requirement already satisfied: markdown-it-py>=2.2.0 in /Users/ndminh/miniconda3/lib/python3.12/site-packages (from rich->keras>=3.5.0->tensorflow<2.20,>=2.19->tf_keras) (2.2.0)
Requirement already satisfied: pygments<3.0.0,>=2.13.0 in /Users/ndminh/miniconda3/lib/python3.12/site-packages (from rich->keras>=3.5.0->tensorflow<2.20,>=2.19->tf_keras) (2.15.1)
Requirement already satisfied: mdurl~=0.1 in /Users/ndminh/miniconda3/lib/python3.12/site-packages (from markdown-it-py>=2.2.0->rich->keras>=3.5.0->tensorflow<2.20,>=2.19->tf_keras) (0.1.0)
Downloading tf_keras-2.19.0-py3-none-any.whl (1.7 MB)
_____ 1.7/1.7 MB 10.5 MB/s eta 0:00:00
Downloading tensorflow-2.19.0-cp312-cp312-macosx_12_0_arm64.whl (252.7 MB)
_____ 252.7/252.7 MB 10.9 MB/s eta 0:00:00
0:0000:0100:01
Downloading libclang-18.1.1-1-py2.py3-none-macosx_11_0_arm64.whl (25.8 MB)
_____ 25.8/25.8 MB 11.1 MB/s eta 0:00:00
00a 0:00:01
Downloading ml_dtypes-0.5.1-cp312-cp312-macosx_10_9_universal2.whl (670 kB)
_____ 670.4/670.4 kB 7.2 MB/s eta 0:00:00
0:00
Downloading tensorboard-2.19.0-py3-none-any.whl (5.5 MB)
_____ 5.5/5.5 MB 10.0 MB/s eta 0:00:00
a 0:00:01
Installing collected packages: libclang, ml-dtypes, tensorboard, tensorflow, tf_keras
  Attempting uninstall: ml-dtypes
    Found existing installation: ml_dtypes 0.4.0
    Uninstalling ml_dtypes-0.4.0:
      Successfully uninstalled ml_dtypes-0.4.0
  Attempting uninstall: tensorboard
    Found existing installation: tensorboard 2.17.0
    Uninstalling tensorboard-2.17.0:
      Successfully uninstalled tensorboard-2.17.0
  Attempting uninstall: tensorflow
    Found existing installation: tensorflow 2.17.0
    Uninstalling tensorflow-2.17.0:
      Successfully uninstalled tensorflow-2.17.0
Successfully installed libclang-18.1.1 ml-dtypes-0.5.1 tensorboard-2.19.0 tensorflow-2.19.0 tf_keras-2.19.0

```

```

In [ ]: import json
        from retinaface import RetinaFace
        from deepface import DeepFace

```


25-04-01 10:58:18 - Directory /Users/ndminh/.deepface has been created
25-04-01 10:58:18 - Directory /Users/ndminh/.deepface/weights has been created

```
In [ ]: gallery_path = "gallery"
        probe_path = "probe"

obj = DeepFace.verify(
    "gallery/Andrew_Garfield.jpg",
    "probe/Andrew_Garfield_4.jpg",
    model_name="ArcFace",
    detector_backend="retinaface",
)
print(obj["verified"])
print(json.dumps(obj, indent=2))
```

```
True
{
  "verified": true,
  "distance": 0.5006100316699272,
  "threshold": 0.68,
  "model": "ArcFace",
  "detector_backend": "retinaface",
  "similarity_metric": "cosine",
  "facial_areas": {
    "img1": {
      "x": 303,
      "y": 85,
      "w": 175,
      "h": 247,
      "left_eye": [
        432,
        185
      ],
      "right_eye": [
        350,
        188
      ]
    },
    "img2": {
      "x": 1036,
      "y": 305,
      "w": 338,
      "h": 480,
      "left_eye": [
        1322,
        504
      ],
      "right_eye": [
        1168,
        496
      ]
    }
  },
  "time": 2.31
}
```