

Laporan Tugas Kelompok 2

Pembelajaran Mesin Lanjut EI – 7007

oleh

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Tugas Kelompok Pembelajaran Mesin Lanjut (PML) ini adalah untuk mendapatkan model yang paling optimal untuk mengenali foto anggota kelas PML (pas foto) dari kumpulan foto yang terdiri dari anggota kelas dan bukan anggota kelas PML. Foto anggota kelas yang dijadikan referensi berjumlah 25 pas foto yang memperlihatkan sebagian besar wajah dan disimpan pada folder “referensi”. Sedangkan foto untuk testing pengenalan wajah berjumlah 49 foto setengah badan dari anggota kelas dan bukan anggota kelas PML. Foto testing ini disimpan pada folder “test”.

Simulasi dilakukan dengan melakukan matching/pencocokan setiap file pada folder “test” untuk dicari pasangannya pada folder “referensi” yang berisi foto anggota kelas. Untuk foto testing yang dikenali/cocok sebagai anggota kelas maka akan ditulis statusnya sebagai “match”, sedangkan yang tidak dikenali akan ditulis sebagai “unknown”.

Pencarian parameter yang optimal dilakukan dengan empat tahapan utama yaitu menentukan model, distance metric dan backend detector. Tahapan akhir setelah menentukan masing-masing model, distance metric dan backend detector yaitu menentukan kombinasi dari setiap parameter yang dianggap paling optimal.

Tahapan pertama untuk menentukan model optimal dijalankan dengan mengatur default parameter untuk Distance = Cosine dan Backend = OpenCV. Perbandingan nilai model yang digunakan serta hasil akurasi yang didapatkan bisa dilihat pada Tabel 1. Model Dblib tidak mendapatkan nilai akurasi karena tidak dapat diproses dikarenakan model tersebut tidak tersedia untuk diunduh (pesan kesalahan model tidak ditemukan). Model yang paling optimal dari uji coba ini yaitu “**Facenet512**”.

Tabel 1. Hasil Perbandingan Model dan Akurasinya

Model	Akurasi
VGG-Face	0.43
Facenet	0.65
Facenet512	0.82
OpenFace	0.53
DeepFace	0.27
DeepID	0.45
ArcFace	0.57
Dlib	-
SFace	0.67

Selanjutnya pada tahapan kedua untuk mendapatkan nilai Distance metric yang optimal. Parameter default diatur dengan menggunakan model = VGG-Face dan Backend = OpenCV. Hasil Distance metric yang optimal dapat dilihat pada Tabel 2. Dengan nilai akurasi perbedaannya tidak terlalu signifikan yaitu 0.43 untuk “cosine” dan 0.47 untuk “euclidean_l2” maka kedua metric ini akan diuji lebih lanjut pada tahapan akhir.

Tabel 2. Hasil Perbandingan Metrik dan Akurasinya

Distance Metrik	Akurasi
cosine	0.43
euclidean	0.33
euclidean_l2	0.47

Kemudian Tahapan ketiga untuk menentukan Backend detector yang optimal dilakukan dengan mengatur default parameter yaitu model = VGG-Face dan distance metric = cosine. Hasil perbandingan untuk mendapatkan backend detector optimal dapat dilihat pada Tabel 3. Backend detector dlib dan mediapipe tidak dapat diproses karena tidak tersedia untuk diunduh (dengan pesan error backend tidak ditemukan). Pada eksplorasi ini didapatkan dua backend yang memiliki nilai yang sama yaitu **opencv** dan **mtcnn**. Kedua backend ini akan diproses lagi pada tahapan akhir.

Tabel 3. Hasil Perbandingan Metode Backend dan Akurasi

Backend	Akurasi
opencv	0.43
ssd	0.33
dlib	-
mtcnn	0.43
retinaface	0.41
mediapipe	-

Kemudian hasil kombinasi dari paramater-parameter yang menghasilkan nilai optimal untuk masing-masing tahapan dapat dilihat pada Tabel 4. Dari hasil kombinasi ini dapat dilihat bahwa model yang optimal yaitu **Facenet512** dan distance metricnya yaitu **cosine**. Untuk parameter backend didapatkan hasil yang sama untuk backend detector **mtcnn** dan **opencv** yaitu 0.82.

Tabel 4. Hasil Perbandingan Parameter Optimal dan Akurasi

Model	Facenet512	Facenet512	Facenet512	Facenet512
distance	cosine	cosine	euclidean_l2	euclidean_l2
backend	opencv	mtcnn	opencv	mtcnn
akurasi	0.82	0.82	0.63	0.65

Hasil yang didapatkan pada Tabel 4 dibandingkan dengan parameter yang menurut rekomendasi paper “S. I. Serengil and A. Ozpinar, “LightFace: A Hybrid Deep Face Recognition Framework,” in 2020 Innovations in Intelligent Systems and Applications Conference (ASYU), 2020, pp. 23–27, doi: 10.1109/ASYU50717.2020.9259802.” bahwa parameter yang optimal untuk kasus pada paper tersebut yaitu: Model = Facenet512, metrik = euclidean_l2, dan backend = retinaface. Hasil uji coba parameter tersebut dalam kasus pengenalan wajah anggota kuliah PML dapat dilihat pada Tabel 5.

Tabel 5. Hasil Simulasi menggunakan parameter dari paper

model	Facenet512
distance	euclidean_l2
backend	retinaface
Akurasi	0.67

Hasil yang didapatkan ternyata lebih baik menggunakan parameter yang didapatkan dari hasil eksplorasi parameter dibandingkan dengan hasil rekomendasi dari paper tersebut. Hal ini bisa disebabkan karena perbedaan dataset yang digunakan. Sehingga kesimpulan yang kami dapatkan dari percobaan ini adalah parameter yang optimal untuk proses deteksi dan pengenalan wajah anggota kulian PML adalah sebagai berikut

Model = Facenet512

Distance metric = Cosine

Backend detector = mtcnn/openCV.

Program yang diupload pada github tugas PML ini menggunakan backend detector **mtcnn**. Terlampir kode program dan output dari jupyter notebook untuk parameter model = **Facene512**, Distance detector = **cosine**, dan Backend detector = **mtcnn**.

Install Library DeepFace

In [1]:

```
pip install deepface
Requirement already satisfied: pandas>=0.25.4 in c:\users\lenovo\miniconda3\lib\site-packages (from deepface) (1.4.2)
Requirement already satisfied: opencv-python>=4.5.5.64 in c:\users\lenovo\miniconda3\lib\site-packages (from deepface) (4.5.5.64)
Requirement already satisfied: Flask>=1.1.2 in c:\users\lenovo\miniconda3\lib\site-packages (from deepface) (2.1.2)
Requirement already satisfied: tensorflow>=1.9.0 in c:\users\lenovo\miniconda3\lib\site-packages (from deepface) (2.8.0)
Requirement already satisfied: numpy>=1.14.0 in c:\users\lenovo\miniconda3\lib\site-packages (from deepface) (1.22.3)
Requirement already satisfied: six in c:\users\lenovo\miniconda3\lib\site-packages (from fire>=0.4.0->deepface) (1.16.0)
Requirement already satisfied: termcolor in c:\users\lenovo\miniconda3\lib\site-packages (from fire>=0.4.0->deepface) (1.1.0)
Requirement already satisfied: itsdangerous>=2.0 in c:\users\lenovo\miniconda3\lib\site-packages (from Flask>=1.1.2->deepface) (2.1.2)
Requirement already satisfied: importlib-metadata>=3.6.0 in c:\users\lenovo\miniconda3\lib\site-packages (from Flask>=1.1.2->deepface) (4.11.3)
Requirement already satisfied: Werkzeug>=2.0 in c:\users\lenovo\miniconda3\lib\site-packages (from Flask>=1.1.2->deepface) (2.1.2)
```

Parameter Setting



In [2]:

```
# Import
from deepface import DeepFace
import math
from math import ceil
import numpy as np
import matplotlib.pyplot as plt
from matplotlib.gridspec import GridSpec
import cv2
import os
from IPython.display import display
from PIL import Image
import glob

# FOLDER foto referensi dan test
ref_path = "referensi"
test_path = "test"
ref = []
test = []
for filename in (glob.glob(ref_path + '/*.jpg') + glob.glob(ref_path + '/*.jpeg') + glob.glob(ref_path + '/*.jfif')):
    ref.append(filename)
for filename in (glob.glob(test_path + '/*.jpg') + glob.glob(test_path + '/*.jpeg') + glob.glob(test_path + '/*.jfif')):
    test.append(filename)

# List Parameter
models = ["VGG-Face", "Facenet", "Facenet512", "OpenFace", "DeepFace", "DeepID", "ArcFace",
distances = ["cosine", "euclidean", "euclidean_12"]
backends = ['opencv', 'ssd', 'Dlib', 'mtcnn', 'retinaface', 'mediapipe']

# Selected Parameter
model = models[2]
distance = distances[0]
backend = backends[3]
force_match = False
#threshold = 0.45
```

Ringkasan File Foto Anggota Kelas



In [3]:

```
size = len(ref)
cols = 5
rows = ceil(size/5)
i=0
print("jumlah file foto anggota kelas: ", size)

fig_ref = plt.figure(figsize=(50,100))
plt.rcParams.update({'font.size': 35})

for sumber in ref:
    i = i + 1
    fig_ref.add_subplot(rows, cols, i)
    plt.xticks([])
    plt.yticks([])
    plt.grid(False)
    plt.imshow(np.squeeze(plt.imread(sumber)), cmap=plt.cm.binary)
    plt.xlabel(sumber)
```

jumlah file foto anggota kelas: 25



referensi\adiyasa nurhalah.jpg



referensi\ahmad Luky Ramdani.jpg



referensi\landik wijanarko.jpg



referensi\arief ichwani.jpg



referensi\arief sartono.jpg



referensi\baud prananto.jpg



referensi\dewi tresnawati.jpg



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Ringkasan File Gambar Test



In [4]:

```

size = len(test)
cols = 5
rows = ceil(size/5)
i=0
print("jumlah file test: ", size)

fig_test = plt.figure(figsize=(50,100))
plt.rcParams.update({'font.size': 35})

for tujuan in test:
    i = i + 1
    fig_test.add_subplot(rows, cols, i)
    plt.xticks([])
    plt.yticks([])
    plt.grid(False)
    plt.imshow(np.squeeze(plt.imread(tujuan)), cmap=plt.cm.binary)
    plt.xlabel(os.path.basename(tujuan))

```

jumlah file test: 49



adiyasa nурfalah.jpg



ahmad Luky Ramdani.jpg



arief sartono.jpg



baud Prananto.jpg



dewi tresnawati.jpg



handoko supeno.jpg



hartanto tantriawan.jpg



imam ekowicaksono.jpg



kemas muhammad Irsan riza.jpg



lathifah arief.jpg



leni fitriani.jpg



meredita susanty.jpg



meza silvana.jpg



mina ismu rahayu.jpg



mohamad idris.jpg



muhammad khaerul naim.jpg



rahman indra kesuma.jpg



reza budiawan.jpg



ricky isfandiari.jpg



riyanto riyanto.jpg



riza ibnu adam.jpg



sulthoni ashiddiqi.jpg



unknown-(1).jpg

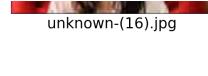


unknown-(10).jpg



unknown-(11).jpg





Menjalankan fungsi find dengan konfigurasi tertentu untuk setiap sumber data



In [5]:

```
# Deklarasi Array
arrsumber = []
arrsumbertext = []
arrtujuan = []
arrtujuantext = []
arrhasil = []

# Numbering Counter
i = 0

# Loop Matching Setiap File Referensi ke Semua File Test
for sumber in test:
    match = DeepFace.find(img_path = sumber, db_path = ref_path, enforce_detection = force_
                           distance_metric = distance, detector_backend = backend)

    # Breakdown Hasil Matching
    i+=1
    arrsumber.append(cv2.cvtColor(cv2.imread(sumber, cv2.IMREAD_COLOR), cv2.COLOR_BGR2RGB))
    arrsumbertext.append(sumber)

    if match.size > 0:
        arrtujuan.append(cv2.cvtColor(cv2.imread(match["identity"])[0], cv2.IMREAD_COLOR))
        arrtujuantext.append(match["identity"][0])
        arrhasil.append("MATCH")
    else:
        arrtujuan.append(np.zeros((100,100,3), np.uint8))
        arrtujuantext.append("UNKNOWN")
        arrhasil.append("UNMATCH")
```

Representations stored in referensi / representations_facenet512.pkl file. Please delete this file when you add new identities in your database.
 find function lasts 35.200764179229736 seconds
 WARNING: Representations for images in referensi folder were previously stored in representations_facenet512.pkl . If you added new instances after this file creation, then please delete this file and call find function again. It will create it again.
 There are 25 representations found in representations_facenet512.pkl
 find function lasts 0.8151960372924805 seconds
 WARNING: Representations for images in referensi folder were previously stored in representations_facenet512.pkl . If you added new instances after this file creation, then please delete this file and call find function again. It will create it again.
 There are 25 representations found in representations_facenet512.pkl
 find function lasts 7.0662009716033936 seconds
 WARNING: Representations for images in referensi folder were previously stored in representations_facenet512.pkl . If you added new instances after this file creation, then please delete this file and call find function again. It will create it again.
 There are 25 representations found in representations_facenet512.pkl
 find function lasts 7.863665819168091 seconds
 WARNING: Representations for images in referensi folder were previously stored in representations_facenet512.pkl . If you added new instances after this file creation, then please delete this file and call find function again. It will create it again.
 There are 25 representations found in representations_facenet512.pkl
 find function lasts 0.7768480777740479 seconds
 WARNING: Representations for images in referensi folder were previously

stored in representations_facenet512.pkl . If you added new instances after this file creation, then please delete this file and call find function again. It will create it again.

There are 25 representations found in representations_facenet512.pkl
find function lasts 0.5884349346160889 seconds

WARNING: Representations for images in referensi folder were previously stored in representations_facenet512.pkl . If you added new instances after this file creation, then please delete this file and call find function again. It will create it again.

There are 25 representations found in representations_facenet512.pkl
find function lasts 0.548532247543335 seconds

WARNING: Representations for images in referensi folder were previously stored in representations_facenet512.pkl . If you added new instances after this file creation, then please delete this file and call find function again. It will create it again.

There are 25 representations found in representations_facenet512.pkl
find function lasts 1.1185779571533203 seconds

WARNING: Representations for images in referensi folder were previously stored in representations_facenet512.pkl . If you added new instances after this file creation, then please delete this file and call find function again. It will create it again.

There are 25 representations found in representations_facenet512.pkl
find function lasts 1.1251800060272217 seconds

WARNING: Representations for images in referensi folder were previously stored in representations_facenet512.pkl . If you added new instances after this file creation, then please delete this file and call find function again. It will create it again.

There are 25 representations found in representations_facenet512.pkl
find function lasts 0.543964147567749 seconds

WARNING: Representations for images in referensi folder were previously stored in representations_facenet512.pkl . If you added new instances after this file creation, then please delete this file and call find function again. It will create it again.

There are 25 representations found in representations_facenet512.pkl
find function lasts 0.8790266513824463 seconds

WARNING: Representations for images in referensi folder were previously stored in representations_facenet512.pkl . If you added new instances after this file creation, then please delete this file and call find function again. It will create it again.

There are 25 representations found in representations_facenet512.pkl
find function lasts 0.9094319343566895 seconds

WARNING: Representations for images in referensi folder were previously stored in representations_facenet512.pkl . If you added new instances after this file creation, then please delete this file and call find function again. It will create it again.

There are 25 representations found in representations_facenet512.pkl
find function lasts 0.5763208866119385 seconds

WARNING: Representations for images in referensi folder were previously stored in representations_facenet512.pkl . If you added new instances after this file creation, then please delete this file and call find function again. It will create it again.

There are 25 representations found in representations_facenet512.pkl
find function lasts 10.180685043334961 seconds

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There are 25 representations found in representations_facenet512.pkl
find function lasts 0.8432884216308594 seconds

WARNING: Representations for images in referensi folder were previously stored in representations_facenet512.pkl . If you added new instances aft

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There are 25 representations found in representations_facenet512.pkl
find function lasts 0.5634920597076416 seconds

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There are 25 representations found in representations_facenet512.pkl
find function lasts 0.6080803871154785 seconds

WARNING: Representations for images in referensi folder were previously stored in representations_facenet512.pkl . If you added new instances after this file creation, then please delete this file and call find function again. It will create it again.

There are 25 representations found in representations_facenet512.pkl
find function lasts 3.523827075958252 seconds

WARNING: Representations for images in referensi folder were previously stored in representations_facenet512.pkl . If you added new instances after this file creation, then please delete this file and call find function again. It will create it again.

There are 25 representations found in representations_facenet512.pkl
find function lasts 0.933952808380127 seconds

WARNING: Representations for images in referensi folder were previously stored in representations_facenet512.pkl . If you added new instances after this file creation, then please delete this file and call find function again. It will create it again.

There are 25 representations found in representations_facenet512.pkl
find function lasts 1.009253978729248 seconds

WARNING: Representations for images in referensi folder were previously stored in representations_facenet512.pkl . If you added new instances after this file creation, then please delete this file and call find function again. It will create it again.

There are 25 representations found in representations_facenet512.pkl
find function lasts 0.6235198974609375 seconds

WARNING: Representations for images in referensi folder were previously stored in representations_facenet512.pkl . If you added new instances after this file creation, then please delete this file and call find function again. It will create it again.

There are 25 representations found in representations_facenet512.pkl
find function lasts 0.765465497970581 seconds

WARNING: Representations for images in referensi folder were previously stored in representations_facenet512.pkl . If you added new instances after this file creation, then please delete this file and call find function again. It will create it again.

There are 25 representations found in representations_facenet512.pkl
find function lasts 0.8016700744628906 seconds

WARNING: Representations for images in referensi folder were previously stored in representations_facenet512.pkl . If you added new instances after this file creation, then please delete this file and call find function again. It will create it again.

There are 25 representations found in representations_facenet512.pkl
find function lasts 0.7611956596374512 seconds

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There are 25 representations found in representations_facenet512.pkl
find function lasts 0.8470401763916016 seconds

WARNING: Representations for images in referensi folder were previously stored in representations_facenet512.pkl . If you added new instances after this file creation, then please delete this file and call find function again. It will create it again.

his file creation, then please delete this file and call find function again. It will create it again.

There are 25 representations found in representations_facenet512.pkl
find function lasts 1.019977331161499 seconds

WARNING: Representations for images in referensi folder were previously stored in representations_facenet512.pkl . If you added new instances after this file creation, then please delete this file and call find function again. It will create it again.

There are 25 representations found in representations_facenet512.pkl
find function lasts 0.6022448539733887 seconds

WARNING: Representations for images in referensi folder were previously stored in representations_facenet512.pkl . If you added new instances after this file creation, then please delete this file and call find function again. It will create it again.

There are 25 representations found in representations_facenet512.pkl
find function lasts 0.8072254657745361 seconds

WARNING: Representations for images in referensi folder were previously stored in representations_facenet512.pkl . If you added new instances after this file creation, then please delete this file and call find function again. It will create it again.

There are 25 representations found in representations_facenet512.pkl
find function lasts 0.7763931751251221 seconds

WARNING: Representations for images in referensi folder were previously stored in representations_facenet512.pkl . If you added new instances after this file creation, then please delete this file and call find function again. It will create it again.

There are 25 representations found in representations_facenet512.pkl
find function lasts 0.7006630897521973 seconds

WARNING: Representations for images in referensi folder were previously stored in representations_facenet512.pkl . If you added new instances after this file creation, then please delete this file and call find function again. It will create it again.

There are 25 representations found in representations_facenet512.pkl
find function lasts 0.6739115715026855 seconds

WARNING: Representations for images in referensi folder were previously stored in representations_facenet512.pkl . If you added new instances after this file creation, then please delete this file and call find function again. It will create it again.

There are 25 representations found in representations_facenet512.pkl
find function lasts 0.7872097492218018 seconds

WARNING: Representations for images in referensi folder were previously stored in representations_facenet512.pkl . If you added new instances after this file creation, then please delete this file and call find function again. It will create it again.

There are 25 representations found in representations_facenet512.pkl
find function lasts 1.1214642524719238 seconds

WARNING: Representations for images in referensi folder were previously stored in representations_facenet512.pkl . If you added new instances after this file creation, then please delete this file and call find function again. It will create it again.

There are 25 representations found in representations_facenet512.pkl
find function lasts 0.7689433097839355 seconds

WARNING: Representations for images in referensi folder were previously stored in representations_facenet512.pkl . If you added new instances after this file creation, then please delete this file and call find function again. It will create it again.

There are 25 representations found in representations_facenet512.pkl
find function lasts 0.7020893096923828 seconds

WARNING: Representations for images in referensi folder were previously stored in representations_facenet512.pkl . If you added new instances after this file creation, then please delete this file and call find function again.

n. It will create it again.

There are 25 representations found in representations_facenet512.pkl

find function lasts 0.8430531024932861 seconds

WARNING: Representations for images in referensi folder were previously stored in representations_facenet512.pkl . If you added new instances after this file creation, then please delete this file and call find function again. It will create it again.

There are 25 representations found in representations_facenet512.pkl

find function lasts 0.7854218482971191 seconds

WARNING: Representations for images in referensi folder were previously stored in representations_facenet512.pkl . If you added new instances after this file creation, then please delete this file and call find function again. It will create it again.

There are 25 representations found in representations_facenet512.pkl

find function lasts 0.7844102382659912 seconds

WARNING: Representations for images in referensi folder were previously stored in representations_facenet512.pkl . If you added new instances after this file creation, then please delete this file and call find function again. It will create it again.

There are 25 representations found in representations_facenet512.pkl

find function lasts 0.8277866840362549 seconds

WARNING: Representations for images in referensi folder were previously stored in representations_facenet512.pkl . If you added new instances after this file creation, then please delete this file and call find function again. It will create it again.

There are 25 representations found in representations_facenet512.pkl

find function lasts 0.7540059089660645 seconds

WARNING: Representations for images in referensi folder were previously stored in representations_facenet512.pkl . If you added new instances after this file creation, then please delete this file and call find function again. It will create it again.

There are 25 representations found in representations_facenet512.pkl

find function lasts 0.7617545127868652 seconds

WARNING: Representations for images in referensi folder were previously stored in representations_facenet512.pkl . If you added new instances after this file creation, then please delete this file and call find function again. It will create it again.

There are 25 representations found in representations_facenet512.pkl

find function lasts 0.6727378368377686 seconds

WARNING: Representations for images in referensi folder were previously stored in representations_facenet512.pkl . If you added new instances after this file creation, then please delete this file and call find function again. It will create it again.

There are 25 representations found in representations_facenet512.pkl

find function lasts 1.9109704494476318 seconds

WARNING: Representations for images in referensi folder were previously stored in representations_facenet512.pkl . If you added new instances after this file creation, then please delete this file and call find function again. It will create it again.

There are 25 representations found in representations_facenet512.pkl

find function lasts 0.6527104377746582 seconds

WARNING: Representations for images in referensi folder were previously stored in representations_facenet512.pkl . If you added new instances after this file creation, then please delete this file and call find function again. It will create it again.

There are 25 representations found in representations_facenet512.pkl

find function lasts 0.7878901958465576 seconds

WARNING: Representations for images in referensi folder were previously stored in representations_facenet512.pkl . If you added new instances aft

er this file creation, then please delete this file and call find function again. It will create it again.

There are 25 representations found in representations_facenet512.pkl
find function lasts 1.4712069034576416 seconds

WARNING: Representations for images in referensi folder were previously stored in representations_facenet512.pkl . If you added new instances after this file creation, then please delete this file and call find function again. It will create it again.

There are 25 representations found in representations_facenet512.pkl
find function lasts 1.0501444339752197 seconds

WARNING: Representations for images in referensi folder were previously stored in representations_facenet512.pkl . If you added new instances after this file creation, then please delete this file and call find function again. It will create it again.

There are 25 representations found in representations_facenet512.pkl
find function lasts 10.460801124572754 seconds

WARNING: Representations for images in referensi folder were previously stored in representations_facenet512.pkl . If you added new instances after this file creation, then please delete this file and call find function again. It will create it again.

There are 25 representations found in representations_facenet512.pkl
find function lasts 0.8413286209106445 seconds

Menampilkan hasil matching wajah untuk setiap foto di folder "test"



In [6]:

```

rows = i
columns = 3
fig = plt.figure(figsize=(30, 400))
plt.rcParams.update({'font.size': 30})

for x in range(rows):
    fig.add_subplot(rows, columns, x*3+1)
    plt.imshow(arrsumber[x])
    plt.xlabel(arrsumbertext[x])
    plt.xticks([])
    plt.yticks([])

    fig.add_subplot(rows, columns, x*3+2)
    plt.text(0.5, 0.5, arrhasil[x], ha='center', va='center')
    plt.axis('off')

    fig.add_subplot(rows, columns, x*3+3)
    plt.imshow(arrtujuan[x])
    plt.xlabel(arrtujuantext[x])
    plt.xticks([])
    plt.yticks([])

print ("model: ", model)
print ("distance: ", distance)
print ("backend: ", backend)
plt.show()

```

model: Facenet512
 distance: cosine
 backend: mtcnn



test\adiyasa nurfalah.jpg

MATCH



referensi\adiyasa nurfalah.jpg



test\ahmad Luky Ramdani.jpg

MATCH



referensi\ahmad Luky Ramdani.jpg



test\ariep sartono.jpg

MATCH



referensi\ariep sartono.jpg





test\baud Prananto.jpg



referensi/baud prananto.jpg



test\dewi tresnawati.jpg

MATCH



referensi/dewi tresnawati.jpg



test\handoko supeno.jpg

UNMATCH



UNKNOWN



test\hartanto tantriawan.jpg

MATCH



referensi/hartanto tantriawan.jpg



test\imam ekowicaksono.jpg

MATCH



referensi/imam ekowicaksono.jpg



test\kemas muhammad Irsan riza.jpg

MATCH



referensi/kemas muhammad irsan riza.jpg



test\lathifah arief.jpg

UNMATCH



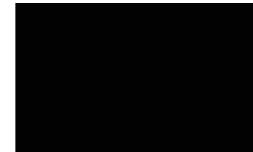
UNKNOWN





test\leni fitriani.jpg

UNMATCH



UNKNOWN



test\meredita susanty.jpg

MATCH



referensi\meredita susanty.jpg



test\meza silvana.jpg

MATCH



referensi\meza silvana.jpg



test\mina ismu rahayu.jpg

MATCH



referensi\mina ismu rahayu.jpg



test\mohamad idris.jpg

UNMATCH



UNKNOWN



test\muhammad khaerul naim.jpg

MATCH



referensi\muhammad khaerul naim.jpg



test\rahman indra kesuma.jpg

MATCH



referensi\rahman indra kesuma.jpg



.....





test\reza budiawan.jpg

MATCH



referensi/reza budiawan.jpg



test\ricky isfandiani.jpg

UNMATCH



UNKNOWN



test\riyanto riyanto.jpg

UNMATCH



UNKNOWN



test\riza ibnu adam.jpg

MATCH

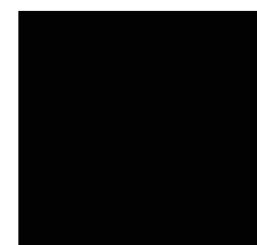


referensi/riza ibnu adam.jpg



test\sulthoni ashiddiqi.jpg

UNMATCH

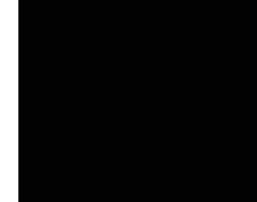


UNKNOWN



test\unknown-(1).jpg

UNMATCH

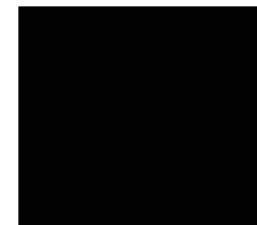


UNKNOWN



test\unknown-(10).jpg

UNMATCH



UNKNOWN



UNMATCH





test\unknown-(11).jpg



UNKNOWN



UNMATCH



UNKNOWN

test\unknown-(12).jpg



UNMATCH



UNKNOWN

test\unknown-(13).jpg



UNMATCH



UNKNOWN

test\unknown-(14).jpg



UNMATCH

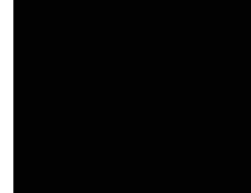


UNKNOWN

test\unknown-(15).jpg



UNMATCH



UNKNOWN

test\unknown-(16).jpg



UNMATCH

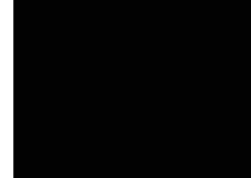


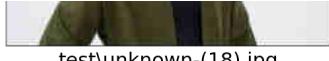
UNKNOWN

test\unknown-(17).jpg



UNMATCH





test\unknown-(18).jpg



UNKNOWN



test\unknown-(19).jpg

UNMATCH



UNKNOWN



test\unknown-(2).jpg

UNMATCH

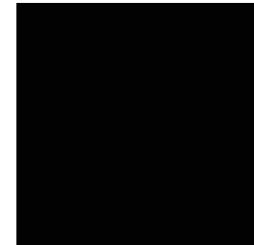


UNKNOWN



test\unknown-(20).jpg

UNMATCH



UNKNOWN



test\unknown-(21).jpg

UNMATCH



UNKNOWN



test\unknown-(22).jpg

UNMATCH

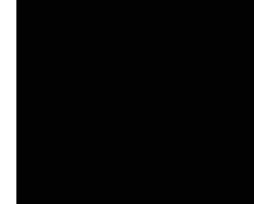


UNKNOWN



test\unknown-(23).jpg

UNMATCH



UNKNOWN



UNMATCH



test\unknown-(24).jpg



UNMATCH

UNKNOWN

test\unknown-(25).jpg



UNKNOWN



UNMATCH



UNKNOWN

test\unknown-(3).jpg



MATCH

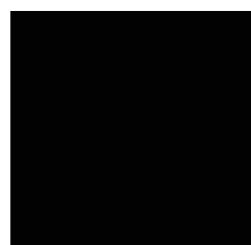


referensi/varuliantor dear.jpg

test\unknown-(4).jpg



UNMATCH

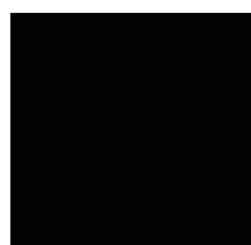


UNKNOWN

test\unknown-(5).jpg



UNMATCH

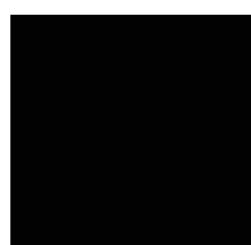


UNKNOWN

test\unknown-(6).jpg



UNMATCH



UNKNOWN

test\unknown-(7).jpg



UNMATCH



UNKNOWN



test\unknown-(9).jpg

UNMATCH



UNKNOWN



test\varuliantor dear.jpg

MATCH



referensi\varuliantor dear.jpg



test\yaya setiyadi.jpg

MATCH



referensi\yaya setiyadi.jpg