

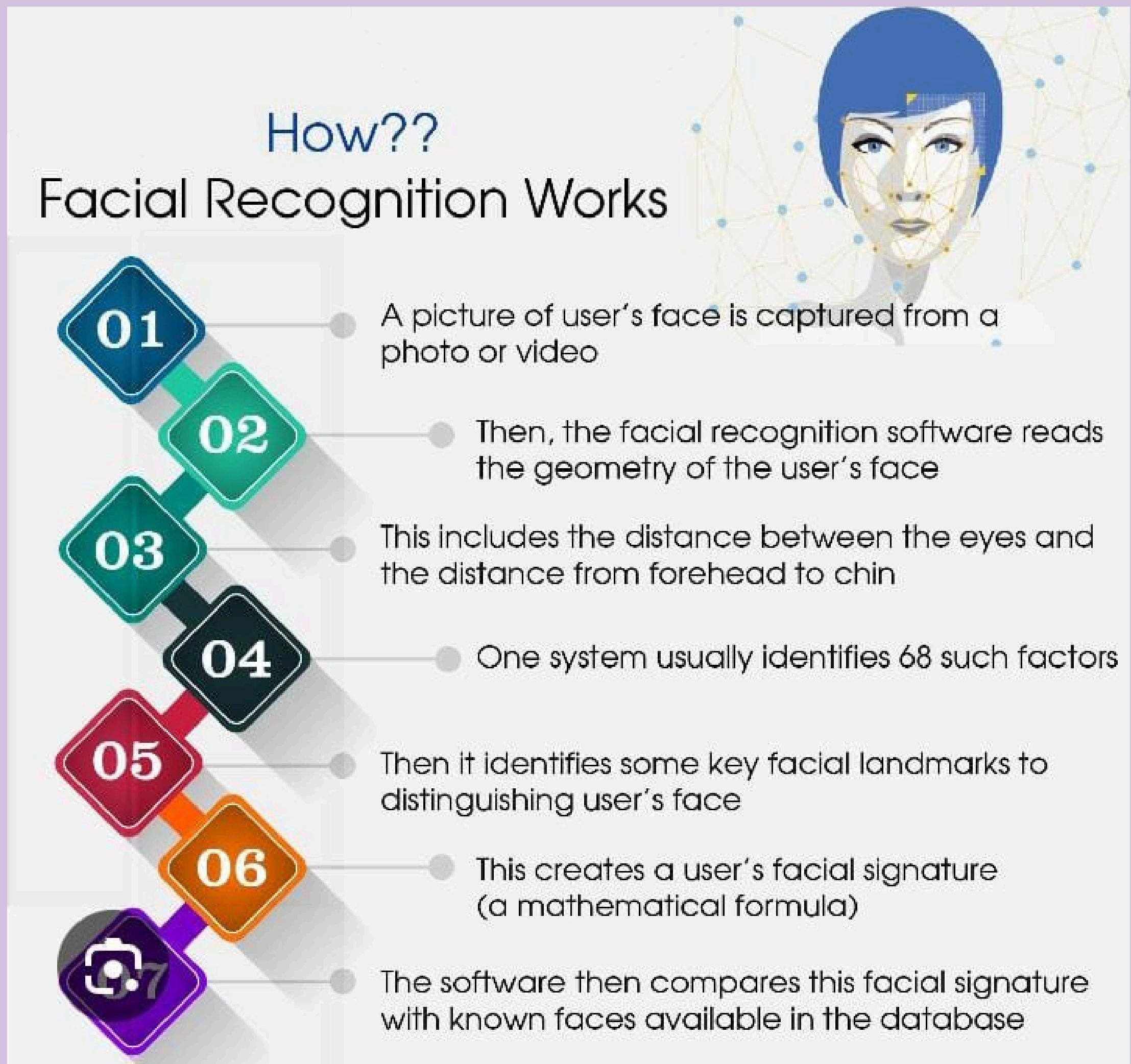
THE UNIVERSITY OF
MIRPURKHAS



DO YOU WANT TO KNOW HOW TO

FACE RECOGNITION

HOW FACIAL RECOGNITION WORKS



HOW IT WORKS



Facial recognition tech is a system that identifies or verifies individuals by analyzing facial features captured from photos or videos. It reads face geometry, creates a unique facial signature (math formula), and compares it with known faces in a database.



LIBRARIES

```
4  from PIL import Image
5  import face_recognition
6  import cv2
7  import numpy as np
8  import pandas as pd
9  import os
10 from datetime import datetime
```

HOW IT WORKS

- PIL → for working with images
- face_recognition → for finding and knowing faces
- cv2 → for using the camera
- numpy → for math and image data
- pandas → for saving data
- os → for file handling
- datetime → for date and time

FACE DATA CODE



```
#  ----->> Load the images and convert them to RGB format <<-----
video_capture = cv2.VideoCapture(0)

# Load known faces and their encodings
muhammad_image = face_recognition.load_image_file("D:\\Face_recognition_Project\\Faces_Student\\2k25_CS_46.jpg")
muhammad_encoding = face_recognition.face_encodings(muhammad_image)[0]
```

HOW IT WORKS

This part of the code starts the webcam using `cv2.VideoCapture(0)` so the system can capture live video for face detection. It then loads Muhammad's image from the given file path using `face_recognition.load_image_file()`. After loading, the image is processed to extract a unique facial encoding through `face_recognition.face_encodings()`. This encoding acts like a digital signature of Muhammad's face, which the program later compares with faces detected in real-time to identify and mark his presence accurately.

FACE LOADED IN LIST



```
31 known_faces = [muhammad_encoding, mubashir_encoding, damni_encoding, prerna_encoding, musabiha_encoding]
32 known_face_name = ["2k25/CS/46 (Muhammad)", "2k25/CS/51 (Mubashir)", "2k25/CS/19 (Damni)", "2k25/CS/64 (Prerna)",
33 | | | | | "2k25/CS/57 (Musabbiha)"]
34
35 # ----->> Prepare for attendance <<-----
36 students = known_face_name.copy()
37
38 face_locations = []
39 face_encodings = []
```

HOW IT WORKS



This code loads an image of Damni from the specified file path, extracts her facial features as a numeric encoding, and stores it for recognition. Then, it creates two lists: one for the known face encodings (used to identify people) and another for their corresponding names or IDs.

FRAME WORK

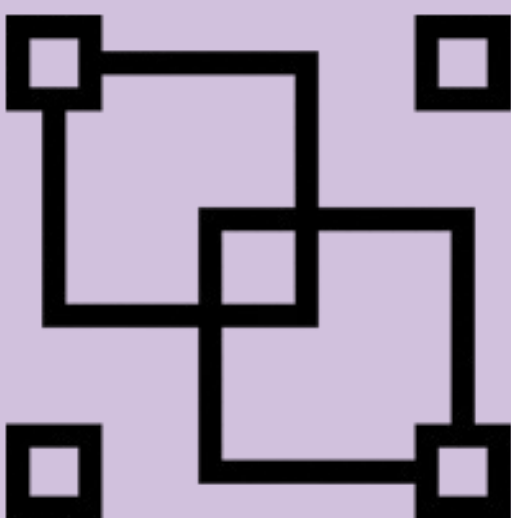


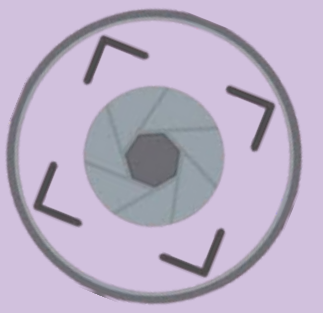
```
51 # ----->> Start capturing video <<-----
52 while True:
53     _, frame = video_capture.read()
54     small_frame = cv2.resize(frame, (0, 0), fx=0.25, fy=0.25)
55     rgb_small_frame = cv2.cvtColor(small_frame, cv2.COLOR_BGR2RGB)
56
```

HOW IT WORKS



This code captures a single video frame from the webcam, reduces its size to one-quarter for faster processing, and then converts the frame’s color format from BGR (used by OpenCV) to RGB (used by most image-processing libraries).





CAMERA FRAME STRUCTURE

```
70 # Add text if the student is present
71 if name in known_face_name:
72     font = cv2.FONT_HERSHEY_SIMPLEX
73     bottomLeftCornerOfText = (10, 30)
74     fontScale = 1
75     fontColor = (0, 255, 0)
76     thickness = 3
77     lineType = 2
78     cv2.putText(frame, name + " Present ", bottomLeftCornerOfText,
79                 font, fontScale, fontColor, thickness, lineType)
```

HOW IT WORKS

This block of code checks if the detected face's name exists in the list of known names. If it matches, the program displays the person's name followed by the word "Present" on the video frame. It first sets the font style using `cv2.FONT_HERSHEY_SIMPLEX`, which provides a simple and readable look. The text position is defined by `bottomLeftCornerOfText = (10, 30)`, meaning the text will appear near the top-left corner of the screen. The size of the text is controlled by `fontScale = 1`, giving it a medium and balanced appearance. The color `(0, 255, 0)` represents green, which visually indicates successful detection. The `thickness = 3` makes the text bold enough to stand out on the frame, while `lineType = 2` ensures smooth, anti-aliased edges. Finally, the `cv2.putText()` function displays the text on the frame with all these settings applied, showing messages like "Muhammad Present" or "Mubashir Present" whenever their faces are recognized.

EXPORT DATA INTO EXCEL FILE



```
81 if name in students:
82     students.remove(name)
83     current_time = datetime.now().strftime("%H:%M:%S")
84     attendance_data = pd.concat([
85         pd.DataFrame([[name, current_time, "Present"]],
86                       columns=["Name", "Time", "Status"])
87     ], ignore_index=True)
88     attendance_data.to_excel(excel_file, index=False)
```

HOW IT WORKS

This part of the code records a student's attendance once their face is recognized. It first checks if the detected person's name exists in the students list. If found, the name is removed to prevent duplicate entries. The `datetime.now().strftime("%H:%M:%S")` line captures the current time in hours, minutes, and seconds. Then, a new row containing the student's name, the recorded time, and their status as "Present" is created using a small DataFrame. This new entry is added to the main `attendance_data` DataFrame using `pd.concat()`. Finally, the updated attendance sheet is saved to an Excel file using `attendance_data.to_excel(excel_file, index=False)`, ensuring that every recognized student's attendance is stored with their name, time, and status in the Excel sheet.

THIS PROJECT DEVELOPED BY (COMPUTER SCIENCE DEPARTMENT) (BATCH-2K25)

This project is a reflection of how students at the University of Mirpurkhas are applying practical programming and AI skills to real world problems. It's designed for readers who want to understand how face recognition can be used to automate tasks like attendance. Through this work, we aim to show how modern education and teamwork can turn innovative ideas into working solutions that make daily systems smarter and more efficient.

PROJECT PARTICIPANTS

1 - MUHAHHAD BIN MANSOOR

2 - MUSABBIHA RAJPUT

3 - MUHAMMAD MUBASHIR

4 - MEMOONA KHAN

5 - DAMNI LOHANA

THIS PROJECT CONCLUDES THE SUCCESSFUL IMPLEMENTATION
OF A REAL-TIME FACE RECOGNITION ATTENDANCE SYSTEM BY
THE CS DEPARTMENT, BATCH 2K25.

THE END