

ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING

DAY – 23

23 July 2025

PROJECT : Face Recognition-Based Attendance System

Results

Encoding of Known Faces

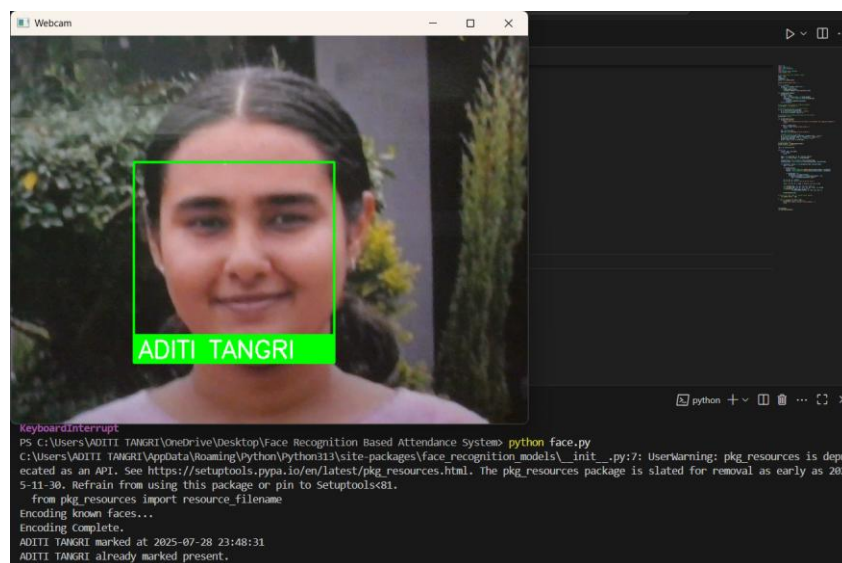
Images of individuals were collected and stored in a folder named "Data". Each image was named using the person's name. Upon launching the system, each image is read and encoded into a 128-dimensional face embedding.

```
from pkg_resources import resource_filename
Encoding known faces...
Encoding Complete.
```

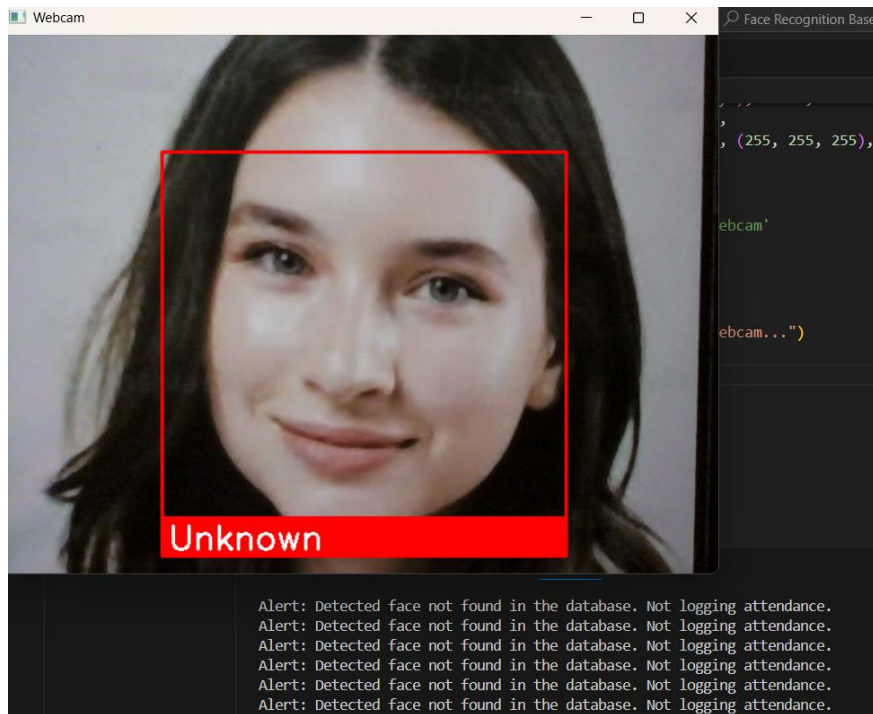
Real-Time Face Detection and Recognition

When the webcam is activated, the system starts detecting faces in real-time. Names were displayed in green boxes, while unknown faces were flagged with red boxes.

- Recognized Face:



- Unknown Face:



Attendance Marking

When a recognized face is found, the system records the person's name and timestamp in a CSV file (attendance.csv). The system prevents duplicate entries within a session by using a `marked_names` set.

```
attendance.csv
1  Name,Time
2  ADITI TANGRI,2025-07-28 23:48:31
3
```

A	B	C
Name	Time	
ADITI TANGRI	28-07-2025 23:48	

User Feedback

The system continuously provides feedback during execution to keep the user informed of its status and decisions:

- Already Marked Individuals

When a known person is detected and has already been marked as present during the current session, the system prints:

```
ADITI TANGRI marked at 2025-07-29 00:05:43
ADITI TANGRI already marked present.
ADITI TANGRI already marked present.
ADITI TANGRI already marked present.
ADITI TANGRI already marked present.
```

This avoids duplicate entries and reassures users that their attendance has been recognized.

- Unknown Faces

If a person is detected but their face does not match any in the pre-loaded dataset (within the set threshold), the system marks them as "Unknown":

```
Alert: Detected face not found in the database. Not logging attendance.
Alert: Detected face not found in the database. Not logging attendance.
```

A red bounding box appears around the face, making it visually clear on-screen that recognition failed.

- Initial Setup Feedback

When the system starts, it loads and encodes known faces from the dataset folder. Status messages are printed:

```
Encoding known faces...
Encoding Complete.
```

This helps users verify that the dataset was processed successfully.

- Exit Notification

When the user presses 'q', the system cleanly stops the video stream and displays:

```
ADITI TANGRI already marked present.
Exit command received. Closing webcam...
```

This prevents abrupt terminations and ensures resources like the camera are properly released.

Overall User Experience

- Performance: The system was able to process and identify faces at real-time speeds
- Accuracy: Recognition was reliable for frontal, well-lit faces. Accuracy declined with poor lighting or side profiles.
- Limitations:
 - Cannot handle multiple identical faces (e.g., twins) unless specifically trained with unique images.
 - Accuracy depends on image quality and lighting.
- Scalability: The system can easily scale by adding more images to the Data directory.