ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING

DAY – 21

Date: Jul 21, 2025

Workflow: Face Recognition-Based Attendance System

1. Load Known Faces (Initialization Phase)

- Load images of known individuals from the dataset/ folder.
- Extract names from image file names (e.g., John.jpg → John).
- Encode each face using the face_recognition library (128-d feature vector).
- Store these encodings in a list for later comparison.

2. Start Webcam Feed

- Use OpenCV to activate the webcam.
- Continuously capture frames in real time.

3. Preprocess Each Frame

- Resize the captured frame to improve processing speed.
- Convert frame color from BGR to RGB (OpenCV default to face_recognition compatible).

4. Detect and Encode Faces in Frame

- Detect face locations using face_recognition.face_locations().
- Encode detected faces using face_recognition.face_encodings().

5. Compare Detected Faces with Known Encodings

- Use face_recognition.compare_faces() and face_distance():
- Calculate the distance between detected and known face encodings.
- Choose the closest match (smallest distance).

6. Mark Attendance

- If a match is found and not already marked:
- Get current date & time using datetime.now().
- Record the name and timestamp in the CSV file using pandas.
- Display the name and bounding box on the webcam feed.

7. Save & Display Attendance

- Keep updating the CSV file with new recognized faces and timestamps.
- Display attendance list or save it for admin use.

CODE IMPLEMENTATION