**A Report on**

**Real-Time Face Recognition Attendance System** -**Attend-Ease**

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**1.1 Objective**

* **Accurate Attendance Logging:**Matches detected faces with pre-stored encodings using face\_recognition.compare\_faces() and updates attendance based on the closest match from face\_recognition.face\_distance().
* **Real-Time Detection and Recognition:**Captures video frames with cv2.VideoCapture() and processes them using face\_recognition.face\_locations() and face\_recognition.face\_encodings() for face detection and encoding.
* **Efficient Data Storage:**Records attendance in a CSV file using csv.writer() and manages headers with ensure\_csv\_headers(), adding monthly headers as needed.
* **Dynamic Attendance Updates:**Initializes all faces as “absent” and updates them to “present” with timestamps using datetime.now() when a match is found.
* **Visual Feedback:**  
  Draws rectangles around recognized faces in the video feed using cv2.rectangle(), providing clear identification.
* **User Control:**  
  Displays the video feed with cv2.imshow() and allows session termination with the 'q' key using cv2.waitKey().
* **Monthly Data Organization:**  
  Organizes data by month using datetime.now().strftime("%B"), ensuring clear record-keeping in the CSV.

**1.2 Methodology**

Initialize Camera

Load Known Faces and Encodings

Capture and process frames

Detect and Encode frames

Compare with Known Encodings

Draw Rectangle Around Faces

Mark Attendance

(Present/absent)

Display Frame

Write Attendance to CSV

Press ‘q’ to Quit

**Figure 1:Flowchart for attendance tracking system**

* Load face encodings for known individuals using face\_recognition.load\_image\_file() and face\_recognition.face\_encodings().
* Initialize attendance status as "absent" for all individuals with the current timestamp.
* Create or update a CSV file with headers based on the current month using csv.writer().
* Capture video frames using cv2.VideoCapture() and resize them for efficient processing.
* Detect faces and generate encodings using face\_recognition.face\_locations() and face\_recognition.face\_encodings().
* Compare detected face encodings with known encodings using face\_recognition.compare\_faces() and face\_recognition.face\_distance().
* Update attendance to "present" with a timestamp when a match is found.
* Draw rectangles around recognized faces in the video feed using cv2.rectangle().
* Display the video feed and allow session termination with the 'q' key using cv2.imshow() and cv2.waitKey().
* Append attendance records (date, name, status, time) to the CSV file at the end of the session.
* Release video capture and close OpenCV windows after exiting.

**1.3 Data Set**

The dataset consists of images of individuals, with the following characteristics:

Image Details:

Average file size: ~300 KB per image.

Format: JPEG (.jpg).

Resolution: Moderate, suitable for general visual tasks.

Lighting: Images are captured in well-lit environments, ensuring clear visibility of features.

Dataset Overview:

Total images: 4.

Overall size: Approximately 900 KB.

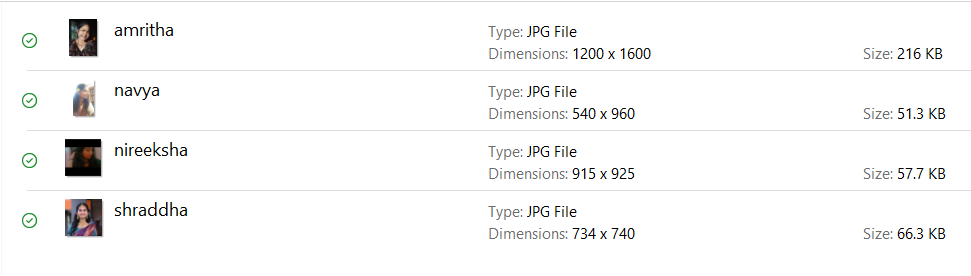


Figure 2:dataset consisting four faces

**1.4 Statistics**

Comparison Between Laptop Camera and Webcam:

**Maximum Detection Distance**:

Webcam: Up to 10 inches.

Laptop Camera: Up to 5 inches.

**Detection Speed**:

Webcam: Detects faces in approximately 35 seconds; supports dynamic conditions (e.g., moving faces).

Laptop Camera: Detects faces in approximately 11 seconds; works better in static conditions (e.g., stationary faces).

**Impact on System Performance**:

Webcam Advantages:

Greater detection distance improves usability in larger spaces.

Dynamic detection enables real-time attendance tracking in dynamic environments.

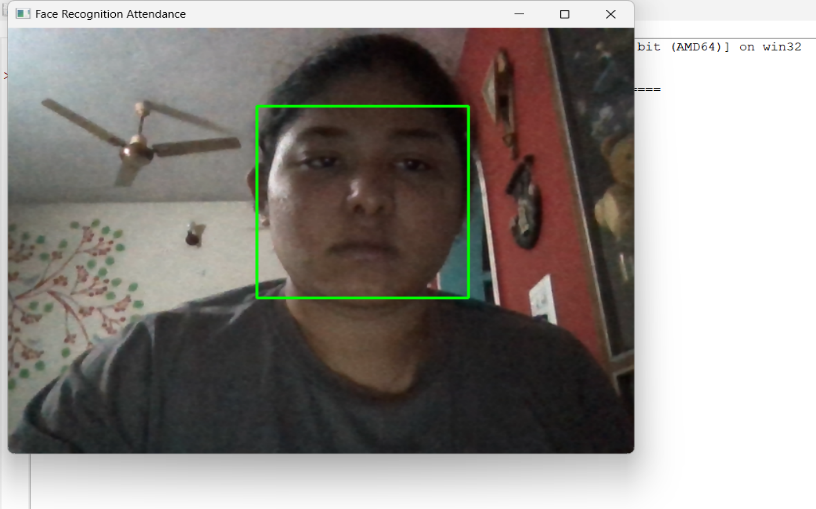
Laptop Camera Advantages:

Faster detection speed for static setups but limited by distance and adaptability.

**1.5 Expected Output**

**Video Feed Display:**

A window showing the real-time video stream with rectangles drawn around detected and recognized faces



*Figure 3 :Videocapture using default camera*

**CSV File:**

* File containing entries with columns: Date, Name, Attendance (present/absent), and Time.
* Names marked as "present" along with timestamps when a recognized face is detected.
* Separate sections in the CSV file for each month, with appropriate headers, ensuring clear and organized record-keeping.

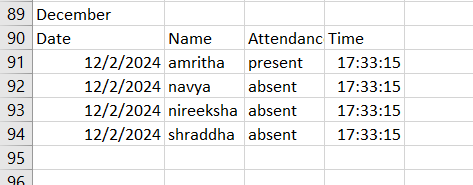
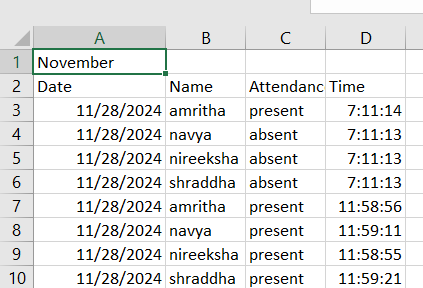


Figure 4:Automated storage of information in a CSV file

**1.5 Reference**

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