

Automated Attendance System

(With Face Recognition)

A Report submitted in partial fulfilment for the Degree of
Bachelor of Technology
in
Computer Science & Engineering

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1. INTRODUCTION TO THE PROJECT

This project develops automated face recognition to identify individuals using facial features, useful for security, attendance, and personalized experiences. Leveraging computer vision and machine learning, it aims to revolutionize technology interaction.

- **Background:** Face recognition mimics complex human visual processing, comparing features to memory. It's used in security, criminal investigations, and tracking missing persons due to its high performance.
- **Motivation:** The project improves inefficient traditional attendance systems, inspired by crime investigation techniques and Facebook's accurate deep face algorithm.
- **Importance:** Automated attendance systems enhance accuracy and efficiency, eliminating manual errors and ensuring real-time identification, highlighting advancements in biometric technology.

2. PROBLEM STATEMENT

- Traditional attendance methods disrupt teaching and are prone to fraud, especially in large classes. A face recognition attendance system automates tracking, reducing distractions and preventing fraud.
- The automated system streamlines the attendance process, saving time and allowing lecturers to focus more on teaching rather than administrative tasks.
- The system must ensure real-time, accurate processing despite challenges such as variations in background, lighting, poses, and facial expressions.
- High accuracy and fast computation are essential to avoid omissions and ensure reliable performance, even under varying conditions.



3. OBJECTIVES

Goals And Objectives :

- To help the lecturers, improve and organize the process of track and manage student attendance.
- Provides a valuable attendance service for both teachers and students.
- Reduce manual process errors by provide automated and a reliable attendance system.
- Increase privacy and security which student cannot present him or his friend while they are not.
- Produce daily reports.
- Flexibility, Lectures capability of editing attendance records.

Proposed System Outcome :

- System will allow user to mark attendance of the students via face recognition technique.
- It will detect faces via webcam and then recognize the faces.
- After recognition it will mark the attendance of the recognized student and update the attendance record.
- The user will be able to print these record details afterward.

4. PROJECT METHODOLOGY

This work is being carried out in four stages:

1. Enrolment & Capturing:

- Enrolled user information
- Capture images.
- Save cropped images to the local drive.

2. Generating Data for Training:

- Take initial parameters from the images.
- Mapping between labels and the corresponding histogram.
- Save the trained data as a '.yml' file..

3. Face Detection & Recognition:

- Crop detected faces for recognition.
- Use the LBPH algorithm to detect faces.
- Compare & detected images with trained database images, Recognize the faces.

4. Attendance Marking:

- Search recognized faces in the database.
- Mark their attendance.



5. IMPLEMENTATION

Overview: The Face Recognition Automated Attendance System uses advanced facial recognition to automate attendance tracking. It involves data collection, model training, real-time face detection, and attendance logging.

Languages & Technologies:

- Programming Languages: Python(3.10.0)
- Libraries/Frameworks: OpenCV, Dlib and NumPy for face detection, recognition and attendance.
- Database: CSV/Excel for data storage.



Unique or Innovative Features:

- Real-Time Face Recognition: Accurate identification in real-time.
- Scalability: Easily handles increasing users and larger databases.
- User-Friendly Interface: Easy management and reporting.



6. RESULTS AND FINDINGS

Presentation of the Project's results and findings:

- The system accurately recognizes faces and marks attendance.
- High accuracy rate of face recognition under lighting conditions.
- Successful integration with the attendance database for real-time updates.

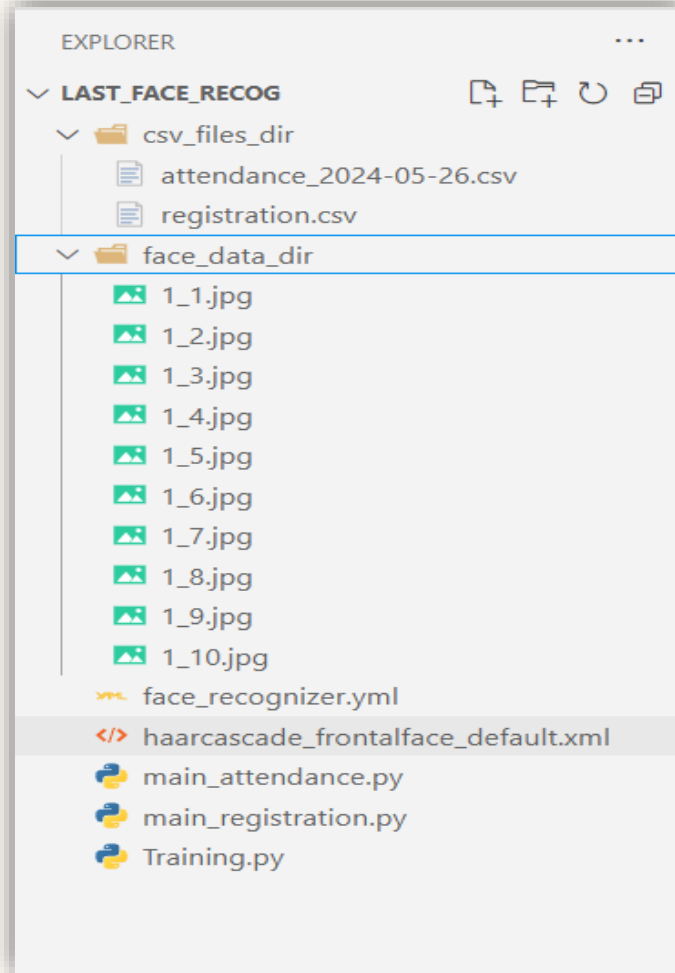
Discussion of Experiments and Evaluations Conducted:

- Multiple test scenarios with different lighting angles, and distances.
- Evaluation with a dataset of 50 images.

Comparison with Existing Solutions or Benchmarks:

- Existing manual attendance systems.
- Existing automated solutions- higher cost and lower flexibility.
- Cost-effective and highly accurate with easy integration.

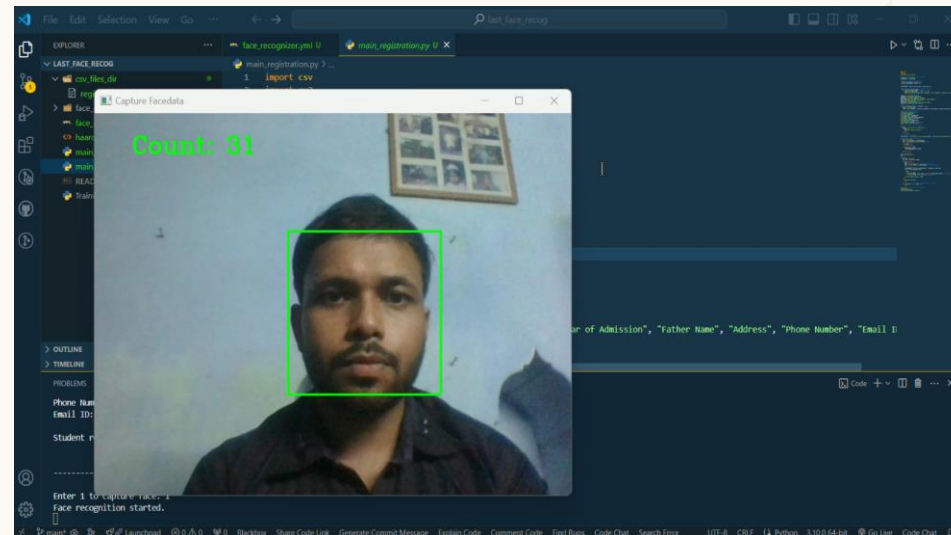
7. PROJECT OUTCOMES



Project Directory

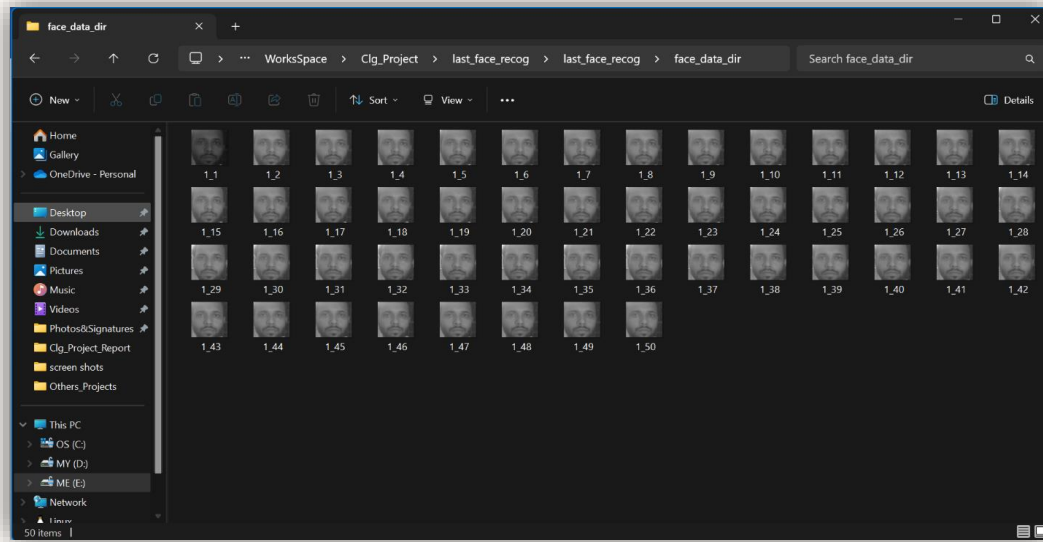


1. Console Output of main_registration.py



2. Capturing 50 Images

7. PROJECT OUTCOMES



3. Captured Images Stored into Specific Folder

ID	Student Name	Department	Year of Admission	Father Name	Address	Phone Number	Email ID
1	Sandip Karmakar	CSE	2021	Dilip Karmakar	Bishnupur	9064176331	abc@gmail.com
2	Soumyadeep Karmakar	CSE	2021	Ranjit Karmakar	Bishnupur	8145728664	sk@gmail.com
3	Pragya Jalan	CSE	2021	Bijoy Jalan	Bishnupur	8972356049	pj@gmail.com

4. Entered Student Data Stored as a CSV File

PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS SEARCH ERROR

```
PS E:\Workspace\Clg_Project\last_face_recog\last_face_recog> python -u "e:\Workspace\Clg_Project\last_face_recog\last_face_recog\tempCodeRunnerFile.py"
Dataset Model Training Completed
PS E:\Workspace\Clg_Project\last_face_recog\last_face_recog> █
```

5. Console Output of Traning.py

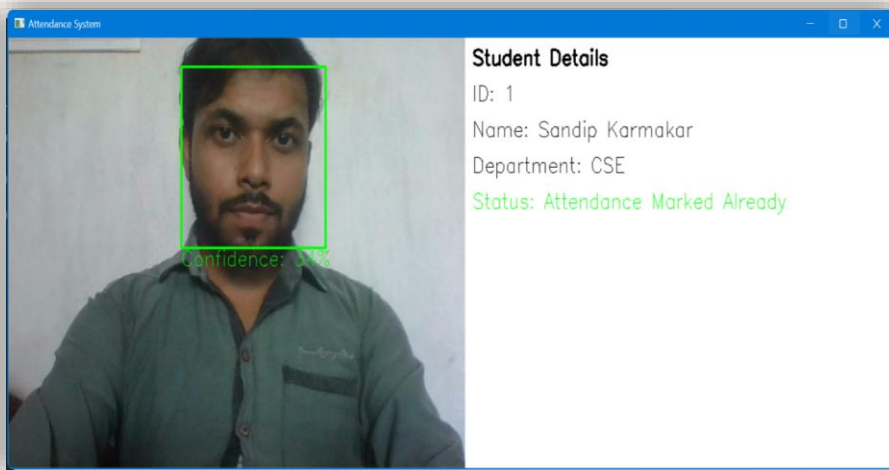
7. PROJECT OUTCOMES

PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS SEARCH ERROR

Code + - [] [X] ... X

```
PS E:\Workspace\Clg_Project\last_face_recog\last_face_recog> python -u "e:\Workspace\Clg_Project\last_face_recog\last_face_recog\main_attendance.py"
Loaded student data: {'1': {'name': 'Sandip Karmakar', 'department': 'CSE'}, '2': {'name': 'Soumyadeep Karmakar', 'department': 'CSE'}, '3': {'name': 'Pragya Jalan', 'department': 'CSE'}}
PS E:\Workspace\Clg_Project\last_face_recog\last_face_recog>
```

6. Console Output of main_attendance.py



attendance_2024-05-27 - Excel

ID	Student Name	Department	Attendance	Date	Time
1	Sandip Karmakar	CSE	Present	27-05-2024	15:28:35

8. Attendance Marked and Stored as a CSV File

7. Face Recognize with Student Information

8. CHALLENGES FACED

Challenges Faced:

- Python library- “Open-CV” not working properly.
- Variability in lighting conditions affecting face recognition accuracy.
- Handling different facial expressions and accessories (e.g., glasses, masks).
- Integration with existing attendance systems and ensuring real-time updates.

Strategies Employed to Overcome Challenges:

- Reinstall again, verify dependencies, update Python & pip
- Implemented advanced image preprocessing techniques to normalize lighting.
- Taking help from many online resources and check algorithms to handle facial variations and accessories.
- Modify code accordingly with given error.

9. CONCLUSION & FUTURE WORK

Conclusion:

This system proposes an automated attendance solution, replacing the manual method with a fast, efficient, and cost-effective approach, eliminating the need for stationary materials and paperwork. It is designed to deliver the desired results and could be expanded to include logout functionality. Future enhancements could integrate additional techniques to improve efficiency.

Future Work:

Recommendations for future improvements include:

- Extending the system to accommodate more students with flexible class lists.
- Allowing template updates for significant facial changes.
- Implementing advanced algorithms for better rotational face recognition.

10. REFERENCES & RESOURCES

- [1]. Prado, K. S. D. (2018, June 19). Face Recognition: Understanding LBPH Algorithm - Towards Data Science. *Medium*. <https://towardsdatascience.com/face-recognition-how-lbph-works-90ec258c3d6b>
- [2]. Reference YouTube Channels:
- Murtaza's Workshop - Robotics and AI. (2022, December 13). *Face Recognition with Real Time Database / 2 Hour Course / Computer Vision* [Video]. YouTube. <https://www.youtube.com/watch?v=iBomaK2ARyI>
 - Computer Vision Engineer. (2022, December 21). *Face recognition + liveness detection: Face attendance system* [Video]. YouTube. https://www.youtube.com/watch?v=_KvtVk8Gk1A
- [3]. Reference Websites Links:
- Face Recognition with Real-Time Database - Computer Vision Zone*. (2022, December 13). Computer Vision Zone. <https://www.computervision.zone/courses/face-recognition-with-real-time-database/>
- [4]. K, M. (2023, January 9). *SMART ATTENDANCE SYSTEM USING FACE RECOGNITION TECHNIQUES*. <https://www.linkedin.com/pulse/smart-attendance-system-using-face-recognition-mr-statistician/>
- [5]. Reference GitHub Link:
- https://github.com/debashis chatterjee1/Automatic_attendence_system_using_facial_recognition_python_openCV

**THANK
YOU !**