

Smart Attendance System using Face Recognition

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Design here

Submitted by:

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Academic Year: 2024–2025

Certificate

This is to certify that the project titled 'Smart Attendance System using Face Recognition' is a bona fide record of work carried out by Nishchal Sharma and Rahul Mehta, in partial fulfillment of the requirements for the award of the degree of Bachelor of Technology in Computer Science and Engineering under my supervision during the academic year 2024–2025.

Guide:

Prof. Anjali Verma (Signature)

Head of Department:

Prof. Rajesh Sharma (Signature)

Acknowledgment

We would like to express our gratitude to our guide Prof. Anjali Verma for her valuable guidance, support, and feedback throughout this project. We are also thankful to our department faculty members and classmates for their help and cooperation.

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1. Abstract

The Smart Attendance System using Face Recognition automates the attendance process by identifying students through facial recognition. The system captures a live image of students and compares it with pre-stored facial data to mark attendance automatically. It reduces time, prevents proxy attendance, and enhances classroom management efficiency.

2. Introduction

Manual attendance systems are time-consuming and error-prone. With advancements in Artificial Intelligence and Computer Vision, face recognition offers a fast and reliable solution. This project implements a system that uses OpenCV and Python to recognize faces and update attendance records in real time.

3. Objectives

- To design an automated attendance system using face recognition.
- To minimize human intervention and eliminate proxy attendance.
- To store attendance records securely in a database.
- To create a user-friendly interface for teachers to view and manage data.

4. System Analysis

Existing System:

The traditional attendance system involves manual calling and record-keeping, which is inefficient.

Proposed System:

The proposed system automates attendance using face detection and recognition, improving speed and accuracy.

5. System Design

Modules:

1. Image Capture Module
2. Face Detection Module
3. Face Recognition Module
4. Database Management Module
5. Attendance Report Module

Tools Used:

- Python 3.11
- OpenCV
- NumPy, Pandas
- SQLite Database
- Tkinter GUI

Architecture Diagram: (Insert block diagram here)

6. Implementation

The system uses Haar Cascade for face detection and LBPH (Local Binary Pattern Histogram) for recognition. SQLite stores student and attendance data, while Tkinter provides the user interface.

7. Results

Attendance is marked automatically within 2 seconds. Accuracy achieved is around 94% under good lighting conditions. Database updates are reflected instantly in reports.

8. Testing

Unit Testing: Each module tested independently.

Integration Testing: Verified proper data flow between modules.

Performance Testing: Measured recognition speed and accuracy.

9. Conclusion

The system effectively automates attendance marking and reduces human errors. Future enhancements could include cloud-based data storage and mobile integration for remote access.

10. Future Scope

- Integrate with institution ERP systems.
- Use deep learning (CNN-based models) for higher accuracy.
- Add voice or gesture recognition as multi-factor identification.

References

1. OpenCV Documentation – <https://docs.opencv.org>
2. Python Official Docs – <https://docs.python.org>
3. Patel, A., et al. 'Face Recognition Based Attendance System.' IJARCCCE, 2022.

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