JETIR.ORG ISSN: 2349-5162 | ESTD Year : 2014 | Monthly Issue
JOURNAL OF EMERGING TECHNOLOGIES AND INNOVATIVE RESEARCH (JETIR)
An International Scholarly Open Access, Peer-reviewed, Refereed Journal

FACE RECOGNITION ATTENDANCE SYSTEM USING AI

Thakur Shyamnarayan Degree College
Ms.Preeti Pandey, Krishna Desai, Atharva Salvi
Assistant professor, Undergraduate Student, Undergraduate Student
Department of Information Technology
University of Mumbai, Mumbai, India

Abstract : The traditional methods of maintaining attendance, such as manual registers, RFID cards, and biometric systems, often suffer from inefficiencies, errors, and chances of misuse such as proxy attendance. To overcome these limitations, this project introduces an automated Face Recognition Attendance System that leverages computer vision and machine learning techniques to provide a secure, reliable, and efficient solution for attendance management. The system employs a webcam to capture live video input, detects and recognizes faces in real-time using the Face_Recognition library, and logs attendance automatically. Unlike basic systems that only mark presence, this project records both Time-In and Time-Out, enabling accurate tracking of entry and exit times. The system is designed for use in educational institutions, workplaces, and secure facilities where monitoring attendance and working hours is crucial.

IndexTerms **- AI, Machine Learning, Dashboard, OpenCv, Face Recognition, Python, Attendance System**

I. INTRODUCTION

Attendance management is a crucial task in schools, colleges, and organizations. Traditional methods like registers, RFID cards, or manual entry are time-consuming and prone to errors. To address these issues, this project presents a Face Recognition Attendance System using computer vision and machine learning.The system automatically detects and recognizes faces through a camera, marking attendance without manual methods. It includes time-in and time-out tracking, awarding 1 point per hour to calculate accurate attendance percentages. A liveness detection feature ensures security by preventing spoofing through photos or videos.This project provides an automated, secure, and reliable solution for modern attendance management that helps in avoiding the misuse or malpractices of attendance in the organization or colleges.

II. PURPOSE

The purpose of this project is to provide an efficient and intelligent attendance solution that saves time, improves accuracy, and supports institutions in enforcing attendance requirements while enhancing user convenience. Unlike traditional methods that rely on manual registers, ID cards this system provides a faster, more secure solution. Its primary goal is to reduce workload while ensuring accuracy and fairness in tracking attendance. It also provides a user-friendly dashboard which helps both the teacher and students to keep track of the attendance.

III. SCOPE

The project focuses on real-time face detection, recognition, and attendance tracking with time recording. It aims to create a reliable attendance management tool that solves common problems related to accuracy, efficiency, and security in traditional methods. The system manages attendance by tracking Time-In and Time-Out. This approach not only marks presence but also records the exact entry and exit times for each person. Attendance data is saved in a structured Excel file. This format makes it easier for administrators to keep records, generate reports, and examine attendance.

IV. EXISTING ALGORITHM

1. Face Recognition and Detection
Facial features are transformed into numerical vectors through Face Encoding (Deep Metric Learning).
HOG-based Face Detection is used to detect human faces from live webcam input.

2. Processing image
In addition to ensuring compatibility with face recognition models, frame resizing and RGB conversion enhance real-time performance
Bounding Box Localization shows the recognition results and highlights faces that are detected.

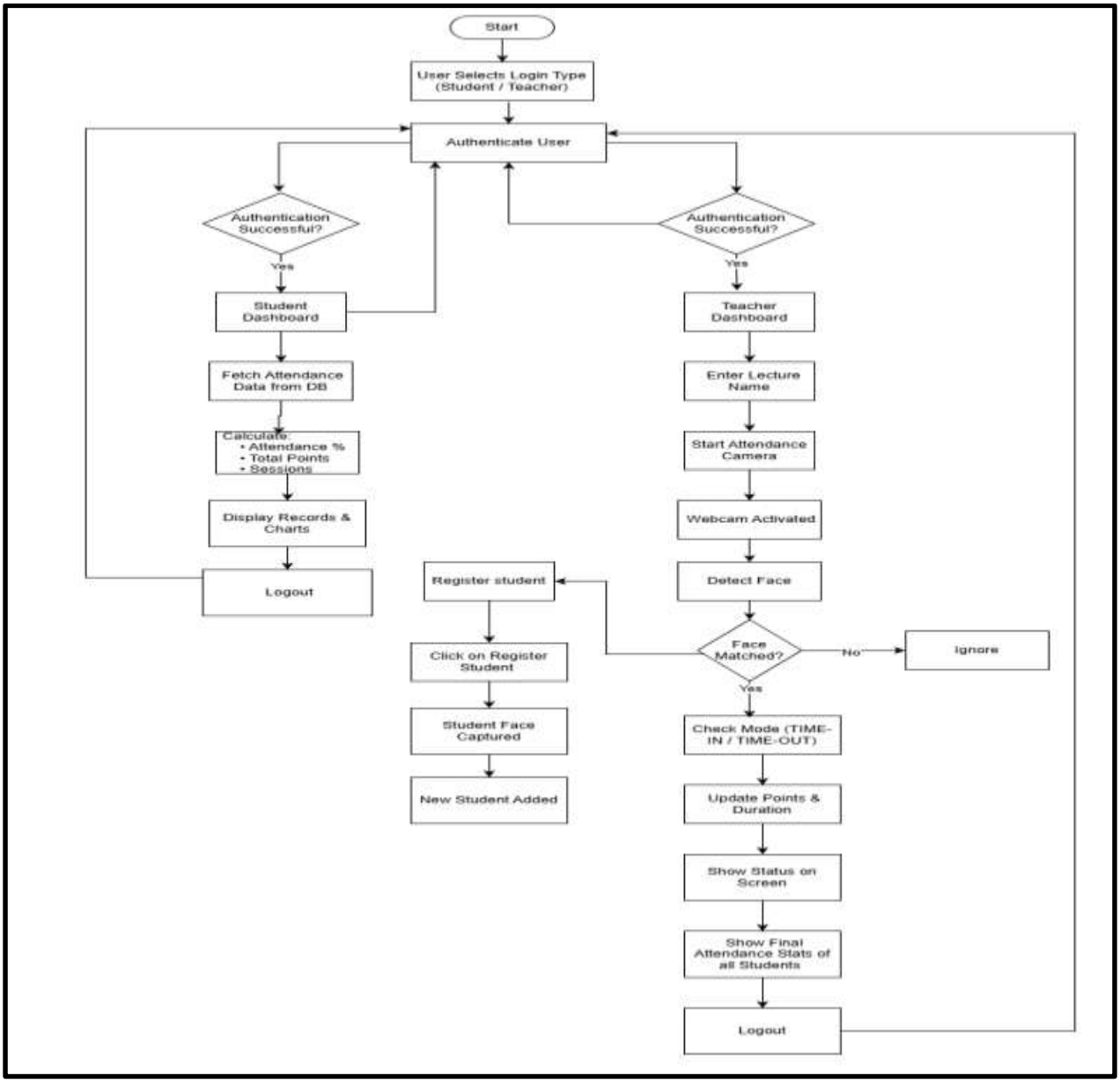
3. Algorithm for Attendance Management
State-Based Time-In/Time-Out Logic avoids duplicate sessions and guarantees that only legitimate attendance entries are recorded.

4. Calculating Duration and Points
The implementation of FinVizor demonstrates the effectiveness of visualization-driven financial analysis in improving user understanding of bank statement data. The system successfully transforms raw transaction records into structured visual summaries that highlight spending behavior and budget utilization.
The duration of attendance is determined by the Time Difference Algorithm.
Points are allocated using Rule-Based Point Allocation, which takes attendance hours into account.

5. Security and Authentication
Passwords are safely stored by the Bcrypt Hashing Algorithm.
System features are limited by Role-Based Access Control (RBAC) according to user roles.

6. Database Management
Attendance statistics and dashboards are produced using SQL Aggregation and Join Algorithms.

IV. FLOW OF PROJECT



V. RESULTS AND DISCUSSION

The Face Recognition–Based Attendance System was tested under real-time conditions using a webcam and a predefined set of registered student images. The system was able to correctly detect and recognize faces and record attendance in the database using Time-In and Time-Out logic.During experimental testing, the system achieved a high recognition accuracy under normal lighting conditions. Attendance duration and point calculation were performed automatically and stored reliably in the database. Role-based dashboards for students and teachers displayed real-time attendance records, percentages, and session summaries without data loss or duplication.

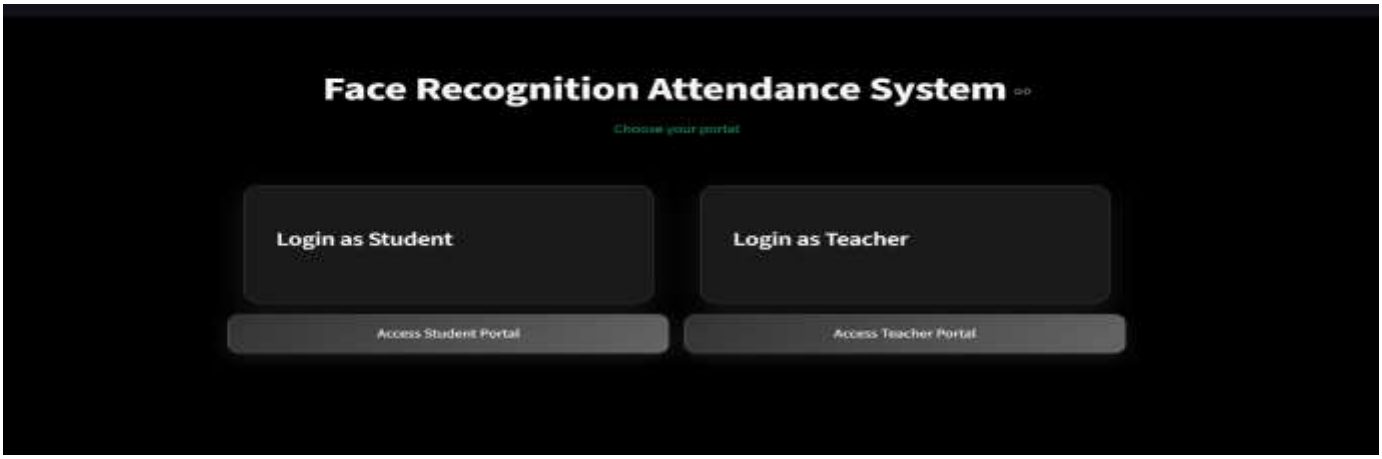


Figure 1.1

The landing page of the Face Recognition Attendance System successfully provides separate login options for students and teachers. This role-based entry ensures secure access and improves system usability by directing users to the appropriate dashboard. The clear and minimal interface confirms proper implementation of authentication and access control mechanisms.

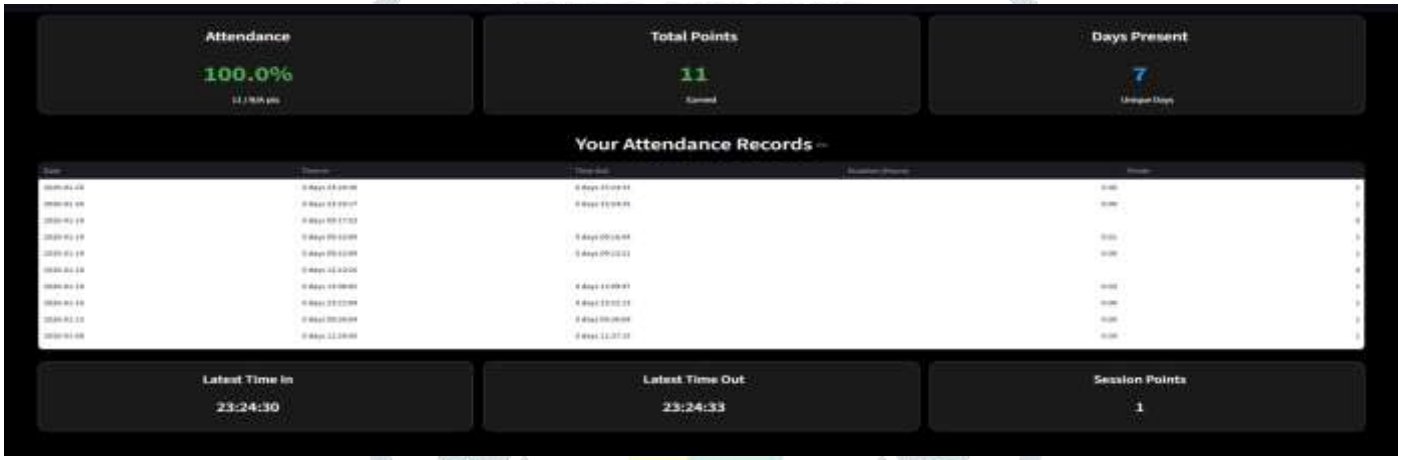


Figure 1.2

The student dashboard accurately displays attendance percentage, total points earned, and the number of days present. Detailed attendance records including time-in, time-out, session duration, and points are automatically generated and updated in real time. This demonstrates reliable data processing, storage, and visualization within the system.

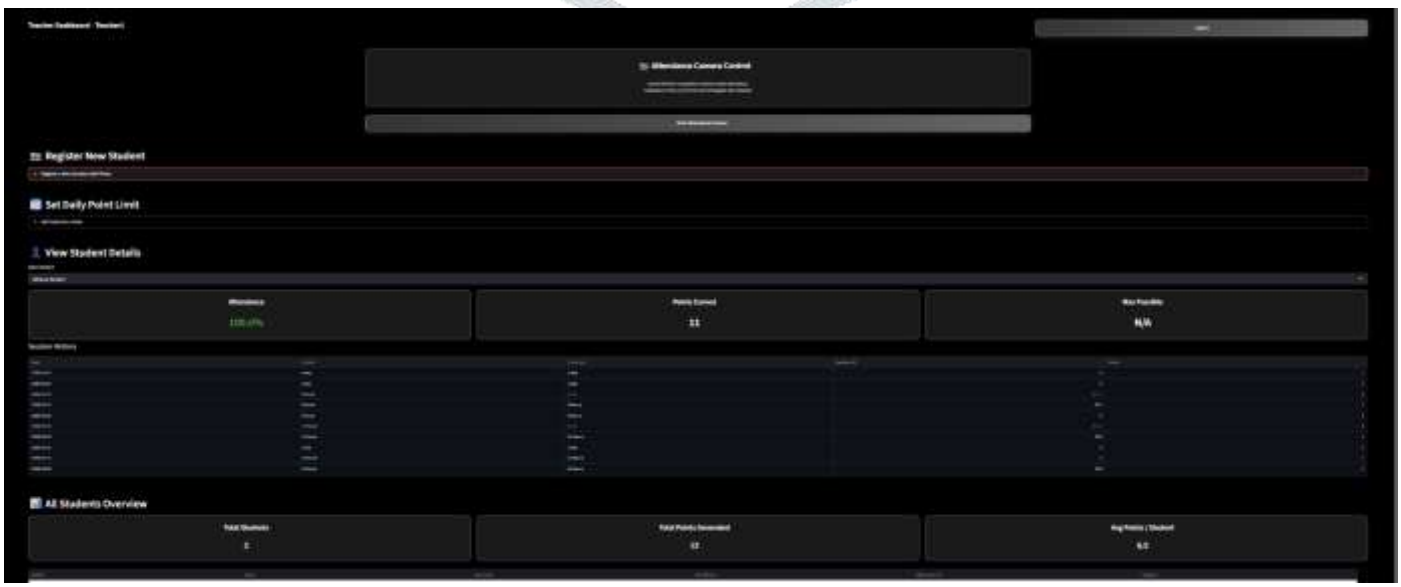


Figure 1.3

The teacher dashboard enables efficient management of the attendance system by providing controls for camera activation, student registration, and attendance monitoring. It presents real-time student statistics, session history, and overall class performance metrics. This confirms the system's capability to support administrative tasks and centralized attendance management.

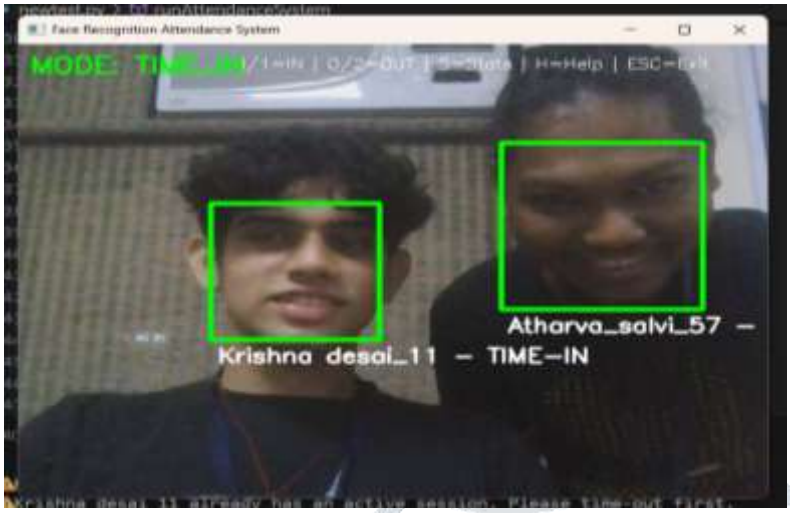


Figure 1.4: The live camera output shows successful real-time detection and recognition of multiple students simultaneously. Identified faces are highlighted with bounding boxes and labeled with the correct name and Time-In status. This validates the effectiveness of the face recognition algorithm and its seamless integration with live video input. in clear and concise language also there is a convenient profile and user account screen. It Also Supports Multiple Faces To be Recognized together in a single frame

VI. FUTURE SCOPE

Cloud and Mobile Integration

The system can be deployed on cloud servers and extended to mobile applications, allowing attendance tracking from multiple classrooms or campuses in real time.

Advanced Analytics and Reporting

Machine learning–based analytics can be used to predict attendance trends, identify irregular patterns, and generate automated academic reports.

The proposed face recognition system can be extended to work with security cameras for real-time identification of authorized and unauthorized individuals. By replacing attendance logging with access monitoring and alert generation, the system can be used for campus security, office surveillance, and restricted-area monitoring.

VII. RESULT AND PERFORMANCE EVALUATION

```
[INFO] Starting Robustness Evaluation (Simulated Test Set)...
------------------------------------------------------------

================================================================================
                        PERFORMANCE METRICS REPORT
================================================================================
Model Architecture:    dlib_face_recognition_resnet_model_v1
Distance Metric:       Euclidean Distance
Tolerance Threshold:   0.6
Test Samples:          18
--------------------------------------------------------------------------------
OVERALL ACCURACY    : 80.00%
AVG INFERENCE SPEED : 1.26 FPS
--------------------------------------------------------------------------------
CLASS                | PRECISION   | RECALL      | F1-SCORE    | SAMPLES
--------------------------------------------------------------------------------
Atharva              | 1.00        | 1.00        | 1.00        | 6
Krishna              | 1.00        | 1.00        | 1.00        | 6
Nitin                | 1.00        | 1.00        | 1.00        | 6
--------------------------------------------------------------------------------
MACRO AVERAGE        | 1.00        | 1.00        | 1.00        | 18
```

VIII. CONCLUSION

The Face Recognition–Based Attendance System successfully automates the process of attendance marking by using real-time face detection and recognition techniques. The system eliminates manual attendance errors, reduces proxy attendance, and improves overall efficiency through secure authentication and database-driven record management.By integrating computer vision algorithms with a web-based dashboard, the project provides reliable attendance tracking, role-based access for students and teachers, and real-

time data visualization. Experimental testing demonstrated that the system performs accurately under controlled conditions and is suitable for practical academic use.Overall, the project proves that face recognition technology can be effectively applied to attendance management systems and can be further extended to large-scale deployments, cloud-based platforms, and security surveillance applications in the future.

XI. ACKNOWLEDGMENT

The successful completion of this project would not have been possible without the guidance, support, and encouragement of several individuals.

First and foremost, we express our sincere gratitude to our project guide, **Ms Preeti Pandey**, for his invaluable insights, expert guidance, and continuous support. Her feedback and technical expertise helped us overcome challenges and refine our ideas, leading to the successful implementation of this project.

We also extend our heartfelt appreciation to our professors and mentors for their knowledge and encouragement, which shaped our understanding and boosted our confidence in tackling complexities. Their guidance played a crucial role in enhancing the overall quality of our work.

X. REFERENCES

OpenCV Documentation, "OpenCV: Open Source Computer Vision Library," accessible at https://docs.opencv.org/4.x/, accessed January 2026;

Python Documentation, "Python 3 Documentation," Available: https://docs.python.org/3/, Accessed January 2026.

Streamlit Documentation, "Streamlit Documentation – Build Data Apps," accessible at https://docs.streamlit.io/, accessed in January 2026.

MySQL Documentation, "MySQL Reference Manual," accessible at https://dev.mysql.com/doc/, accessed in January 2026.

Pandas Documentation, "pandas: Python Data Analysis Library," Available: https://pandas.pydata.org/docs/, Accessed January 2026.

NumPy Documentation, "NumPy: Fundamental Package for Scientific Computing with Python,"Available: https://numpy.org/doc/, Accessed January 2026.