



Face Recognition Based Attendance Management System

Prabhanjan DD¹, Nithin YJ², Shivakumar³, Yeshwanth H.T⁴, Arathi H.L⁵

Student, CSE, East West College of Engineering, Karnataka, India¹

Student, CSE, East West College of Engineering, Karnataka, India²

Student, CSE, East West College of Engineering, Karnataka, India³

Student, CSE, East West College of Engineering, Karnataka, India⁴

Assistant Professor, Dept CSE, East West College of Engineering, Karnataka, India⁵

Abstract: Identification of people in any organization or colleges for the purpose of attendance marking is one such a software of face recognition. The use of Attendance Management System is to performs the regular activities of attendance marking and analysis with reduced human intervention. In this method the camera is settled and it will capture the image, the faces are recognized along with the database and eternally the attendance is marked.

This system is depended on face detection and recognition concept, that detects the employees or student using webcam when they arrive in the office or class room and marks the attendance by recognition.

Keywords: Face Recognition, Attendance Management System, Haar Cascade.

I. INTRODUCTION

Maintaining of student attendance using old-style methods is very unattractive for every institute and also consistency of that method is very poor. Attendance Management System Using Face Recognition is swapping the activity of traditional attendance where teachers take manually attendance of every student in class. This system used for different administrations and also different educational institute for marking the attendance. Face recognition is the biometric method of identifying an individual by comparing live capture. Face recognition technology is gradually evolving to a universal biometric solution since it requires virtually zero efforts from the user end while compared with other biometric options. Machine learning is one of the finest domains among all the domains because it provides dataset only once as an input and provide a desirable output by applying a different machine learning algorithm. In earlier days each education institute, school or colleges are considers a student attendance factor very cautiously. Computerized attendance management system using face recognition will help most because it handles all the problems related to time, safety problem and delegation issue very simply. Haar Cascade is basically used to complement this system. Haar Cascade is often applied for analyzing images. Attendance Management System Using Face Recognition which saves time, avoid fake attendance also help for security purpose.

II. LITERATURE SURVEY

In [1] 2017 Samuel John presented a Face Recognition Attendance System with GSM Notification. This system uses the Viola Jones algorithm. This algorithm used for detect faces. Also, Fisher faces algorithm was used to create patterns of the faces which were caught. That created templates stored in the database. This system used library which is OpenCV and used Software Development Kit (SDK) to create the graphical user interface. In [2] other paper, Jenif D Souza introduces an Automated Attendance Marking and Management System by Facial Recognition. This system marked students' attendance automatically by the camera which captures the photo of student in the class. This system uses the algorithm called Histogram. Histogram algorithm used for face identification purpose. In this algorithm, the face image is converted to matrix form. Histogram are used for recognize of the exact faces. This system overcomes the problem of time consuming. In [3] 2019 Nandhini R. introduced Attendance System based on face recognition. This system captures the video of the students, convert it into frames and store it in the database. Also, Convolution Neural Network (CNN) algorithm is used to detect faces. This System helps in improving the accuracy and speed. In [4] 2019, Shreya. k Sawhney, Karan kicker, Samyak Jain introduced Real Time Smart Attendance Management System Using Face Recognition Techniques. In this system they use face detection and recognition method using convolution Neural Network and Principal Component Analysis (PCA) but using two camera some camera is used for the face detection and recognition



at the door of classroom and the camera is used at inside the classroom for checking proxy attendance. In [5] 2016, E Varadarajan, R Dharani, S Jeevitha, S. Hemalata introduced Automatic Attendance Management System Using Face Recognition. In this system the use Eigen Faces, Eigen Weight method for face detection this system the camera detention the image and then system crop the faces of student and tie the faces with student database. In [6] 2017, Poornima S, Sripriya N introduced Attendance Management System using Facial Recognition with Audio Output and Gender Classification. In this system they use Viola Jones algorithm and Principal Component Analysis (PCA) for the face recognition and they also use the gender classification and Voice conversion module. After the face detection and recognition, the system uses the Microsoft Speech API for announce the absent student names this can

III. METHODOLOGY

This Proposed system improves the attendance management system using of our unique characteristics of their face. For the purpose of confirmation and documentation face acknowledgment technique is used. The algorithm which uses for biometric facial recognition follow different steps of image processing

1. System Design and Planning

Objective: Automate the attendance process using facial recognition to improve efficiency, accuracy, and prevent proxy attendance.

User Roles: Define different user roles, such as Admin (who manages the system), Student/Employee (whose attendance is tracked), and System (which performs face recognition and stores data).

Scope and Requirements: Outline the hardware (camera, server) and software (programming languages, libraries) requirements.

2. Data Collection and Preprocessing:

Face Dataset Creation:

Capture training images of each individual (students/employees) for whom attendance will be tracked.

Image Preprocessing:

Face Detection: Use algorithms like Haar Cascade Classifier or MTCNN to detect faces in the images.

3. Face Detection and Recognition:

Real-Time Face Detection:

Capture live video or images from the camera.

Use face detection algorithms (like Haar Cascade or MTCNN) to locate faces in the image frame.

Face Recognition:

After detecting the face, extract facial features (embeddings) and compare them to the stored embeddings in the database.

4. Attendance Logging:

Database Setup:

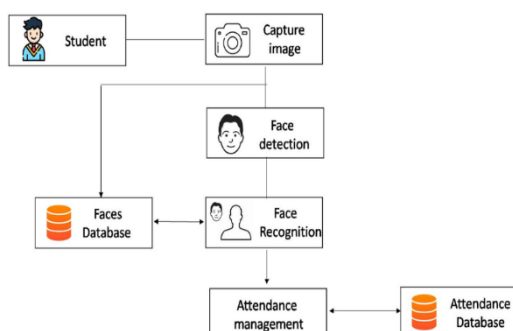
Set up a relational database (like MySQL or SQLite) to store the face embeddings, user information (name, ID), and attendance records.

Alternatively, use a NoSQL database like MongoDB for more flexibility in storage.

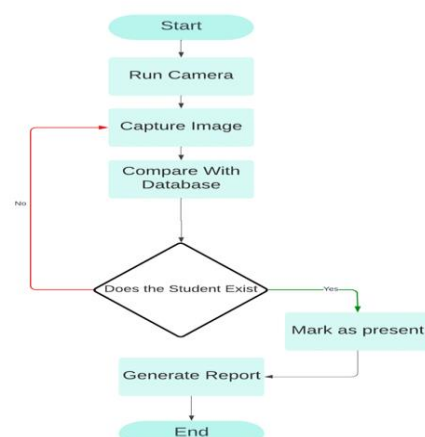
Attendance Marking:

If a recognized face matches, log the attendance by recording the individual's ID, date, and timestamp in the database.

SYSTEM ARCHITECTURE



DATA FLOW DIAGRAM





IV. COMPARISON OF FACIAL RECOGNITION TECHNIQUES

There are changed technical paper about the Attendance management system using face recognition. We studied some papers; they used changed methods or techniques. Below is the chart of instant of some papers. We studied more than five research paper to make our project and this paper support us to solve various problems and concepts regarding how to make project more efficient and also less time consuming.

Title Of The Paper And Year	Authors	Summary	Advantages	Limitations
"Face recognition based attendance management system using deep learning method (2024)"	Angulakshmi M , Susithra.V	Real-time attendance management system that combines MTCNN for face detection and FaceNet for feature extraction, using SVM and RandomForest classifiers to achieve up to 99% accuracy; while the system is efficient and scalable.	Improved accuracy in attendance records; reduced manual errors and eliminated duplicate entries.	Lighting Conditions: Performance may degrade under poor lighting or extreme shadows. Pose Variations: Faces turned away or partially covered can affect detection accuracy. Scalability: As the database grows, recognition speed may decrease without optimization.
"A Machine Learning-Based Attendance Management System (2024)"	G Mageshvaran Dr. V.J.Sowmya	Faces in photos are detected using the histogram of oriented gradient method, and students' faces are recognized by computing and comparing their facial features using deep learning techniques. Multiple faces can be recognized in real time by our technology.	High accuracy in face recognition; seamless integration with IoT for real-time attendance tracking.	Data Quality and Availability: The effectiveness of machine learning models heavily relies on the quality and quantity of data. Environmental Factors: External conditions like lighting, camera quality, and user attire can affect the accuracy of attendance systems.
Title Of The Paper And Year	Authors	Summary	Advantages	Limitations
"Enhanced Attendance Management of Face Recognition Using Machine Learning (2025)"	Sowmya Ravipati, Lasya Modem, Sahith Yellinedi, Tejeswara Rao Namburi, Sajida Sultana Sk	Presents a real-time face recognition system that dynamically adapts to environmental conditions, offering high accuracy and consistency for attendance management in various settings, but it faces limitations related to environmental sensitivity, hardware requirements, and privacy concerns.	Does not require pre-registered datasets; adaptable to various conditions including lighting variations and facial expressions.	Environmental Sensitivity: The system's performance may degrade under challenging environmental conditions, such as poor lighting or extreme facial angles. Privacy Concerns: Handling biometric data necessitates strict adherence to privacy regulations and ethical considerations.
"Attendance System based on Facial Recognition using OpenCV(2024)"	Thota Radha Rajesh , Lakshmi Narayana Kuchipudi , Akhila Dammalapati	This research presents an automated attendance system leveraging facial recognition technology to replace traditional manual methods.	It eliminates proxy attendance and fraud by ensuring only authorized individuals are marked present. Being open-source, it is cost-effective and can be easily integrated with existing databases for real-time monitoring. The system is scalable and flexible, making it suitable for various applications, including schools and workplaces.	Camera Quality Dependency: Requires high-resolution, stable cameras for consistent detection; low-quality webcams may cause frequent recognition failures. Limited Scalability: As the number of users increases, the training and recognition time using LBPH can become slower and less efficient. Lighting Conditions: The system's accuracy drops in low-light or overly bright environments due to limited robustness of Haar Cascade detection.

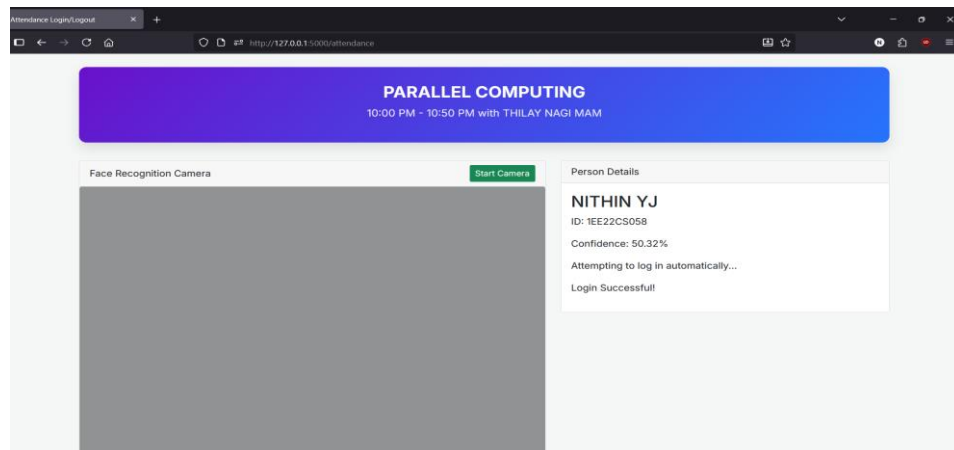
- **Image Enhancement**

In Image Enhancement process it takes images from user side check all quality of images and enhance quality of image using method in machine learning. Image quality is the most crucial factor for specify a particular person so Haar Cascade algorithm is very accommodating for the image enhancement and improvement process.



• Face Detection

In attendance management system initially detention images enroll by the student and that Image patterned in our database created by the management side. Registered image matched to every database image if that is existing in system database then that student patent as a present either marked as a absent.



• Feature Extraction

In this step, all data will be extracted from the samples created to make template using facial recognition.

• Face Database

In this step system can use the dataset that is earlier present-day in the database of system for parallel a entered carbon copy with database images. In database save all student info for helping to system to take detailed student presence in very less time.

V. ADVANTAGES

- There are many benefits to attendance management system using face recognition such as its convenience and social acceptability. Increasing security and enhance comfort day today life.
- Attendance management system using face recognition is easy to use and it can be performed without person.
- Attendance Management System Using Face Recognition gives fast and accurate report of Attendance.
- This system has come faster and more accurate under over condition from different angle.
- Attendance using face recognition is time saving and without human errors. Sometime miss the attendance form student side or Teacher side and so it will be very helpful for incredulous this type of all disadvantages.
- In pandemic situation it is helpful for student and teachers' health security.
- Attendance using face recognition is also higher security in our work place.

VI. RESULTS

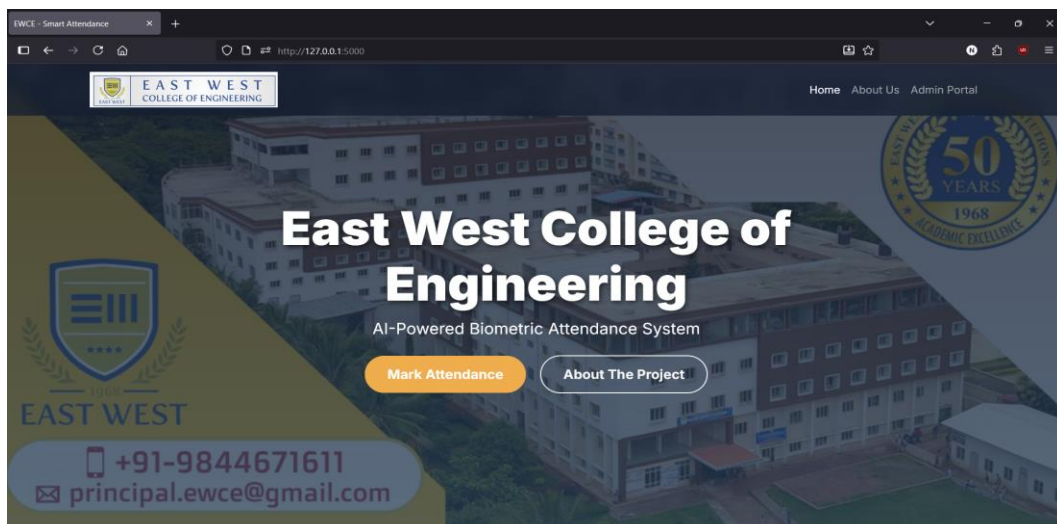
Attendance Management system using face acknowledgments is very simple to use and works proficiently with less time condition. This is the automated system so if admin created a student profile once in database, then it will use automatically by the number of times in face detection and recognition process. This system is based on Haar Cascade methods. For initializing this system, admin firstly create all student profile with their name, roll number, department and other educational details.



- Server logs

```
127.0.0.1 - - [13/Oct/2025 22:18:56] "GET /attendance HTTP/1.1" 200 -
127.0.0.1 - - [13/Oct/2025 22:19:02] "POST /recognize_face HTTP/1.1" 200 -
127.0.0.1 - - [13/Oct/2025 22:19:25] "POST /recognize_face HTTP/1.1" 200 -
127.0.0.1 - - [13/Oct/2025 22:19:27] "POST /recognize_face HTTP/1.1" 200 -
127.0.0.1 - - [13/Oct/2025 22:19:29] "POST /recognize_face HTTP/1.1" 200 -
127.0.0.1 - - [13/Oct/2025 22:19:31] "POST /recognize_face HTTP/1.1" 200 -
127.0.0.1 - - [13/Oct/2025 22:19:33] "POST /recognize_face HTTP/1.1" 200 -
127.0.0.1 - - [13/Oct/2025 22:19:35] "POST /recognize_face HTTP/1.1" 200 -
127.0.0.1 - - [13/Oct/2025 22:19:37] "POST /recognize_face HTTP/1.1" 200 -
127.0.0.1 - - [13/Oct/2025 22:19:40] "POST /recognize_face HTTP/1.1" 200 -
[2025-10-13 22:19:40.773832] SCHEDULER: Running absentee check...
127.0.0.1 - - [13/Oct/2025 22:19:42] "POST /recognize_face HTTP/1.1" 200 -
127.0.0.1 - - [13/Oct/2025 22:19:42] "POST /mark_attendance HTTP/1.1" 200 -
127.0.0.1 - - [13/Oct/2025 22:20:11] "GET /admin/attendance_records HTTP/1.1" 200 -
127.0.0.1 - - [13/Oct/2025 22:20:12] "GET /admin/attendance_records HTTP/1.1" 200 -
127.0.0.1 - - [13/Oct/2025 22:20:30] "GET /admin/dashboard HTTP/1.1" 200 -
127.0.0.1 - - [13/Oct/2025 22:20:30] "GET / HTTP/1.1" 200 -
127.0.0.1 - - [13/Oct/2025 22:20:30] "GET /static/images/logo.jpg HTTP/1.1" 304 -
127.0.0.1 - - [13/Oct/2025 22:20:33] "GET /about HTTP/1.1" 200 -
127.0.0.1 - - [13/Oct/2025 22:20:33] "GET /static/images/nithin.jpg HTTP/1.1" 304 -
127.0.0.1 - - [13/Oct/2025 22:20:33] "GET /static/images/friend3.jpg HTTP/1.1" 404 -
127.0.0.1 - - [13/Oct/2025 22:20:33] "GET /static/images/friend4.jpg HTTP/1.1" 404 -
127.0.0.1 - - [13/Oct/2025 22:20:33] "GET /static/images/yash.jpg HTTP/1.1" 304 -
[2025-10-13 22:20:40.792909] SCHEDULER: Running absentee check...
[2025-10-13 22:21:40.800247] SCHEDULER: Running absentee check...
```

- Home Page



- Login Page

Admin Login

Username

Password

Login



- Managing Classes

Add New Class

Day of the Week

Monday

Subject Name

Instructor Name

Instructor Telegram ID (Optional)

e.g., 123456789

Start Time

-- : -- --

End Time

-- : -- --

Close

Save Class

- Time Table

Manage Weekly Timetable

Add New Class

Monday

Tuesday

Wednesday

Thursday

Friday

Saturday

Sunday

Time Slot	Subject	Instructor	Instructor Telegram ID	Actions
03:00 PM - 03:14 PM	PARALLEL COMPUTING	THILAY NAGI MAM	5253636113	<a>Edit <a>Delete
03:00 PM - 03:40 PM	Big Data Analytics	Gnanamani Mam	5253636113	<a>Edit <a>Delete

- Student Registration

Registered Students

Add New Student

College ID	Name	Registered On	Actions
1EE22CS054	Mithun R	2025-10-13	<a>Edit <a>Delete
1EE22CS058	NITHIN YJ	2025-10-13	<a>Edit <a>Delete
1EE22CS093	YASHWANTH HT	2025-10-13	<a>Edit <a>Delete

- Attendance Records

Attendance Records

Logout

Back to Dashboard

Select Date:

13/10/2025

View

Export to Excel

Export to PDF

Clear All Records

S.NO	College ID	Name	Subject	Instructor	Time	Action	Actions
1	1EE22CS058	NITHIN YJ	PARALLEL COMPUTING	THILAY NAGI MAM	10:19:42 PM	<a>LOGIN	<a>Delete



When the all process has done then generate the marked attendance of student in excel sheet format. Attendance management system is recognizing all images with different angles and lights, if some entered data is not in our dataset then it is stored in dataset as an unknown data. The attendance of student faces recognition is marked in real time, and in the final step of the procedure is that the excel sheet of attendance is saved by the system robotically and imported in student database.

VII. CONCLUSION

In this proposed Attendance Management System Using Face Recognition is the better model for attendance management for students in the classroom and also at the other places. Now in this today's era a large number of systems are available like biometrics or other methods but the facial recognition is the best option for the accuracy. There is no special hardware requirement for the implementation of the system. A camera Laptop and database are sufficient for developing attendance management system using face recognition.

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