

# Student Daily Attendance System Using Face Recognition

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*Abstract: Attendance marking is a common activity to keep track of the presence of students daily in all academic institutions at all grades. Traditional approaches for marking attendance were manual. These approaches are accurate without a chance of marking fake attendance but these are time-consuming and laborious for a large number of students. To overcome the drawbacks of manual systems, automated systems are developed using radio frequency identification-based scanning, fingerprint scanning, Face-recognition, and Iris scanning based biometric systems. Each system has its pros and cons. Besides, all of these systems suffer from the limitation of human intervention to mark the attendance one by one at a time. To overcome the limitations of existing manual and automated attendance systems, in this work, we propose a robust and efficient attendance marking system from a single group image using face detection and recognition algorithms. In this system, a group image is captured from a high-resolution camera mounted at a fixed location to capture the group image for all the students sitting in a classroom. Next, the face images are extracted from the group image using algorithm followed by recognition using a convolutional neural network trained on the face database of students. We tested our system for different types of group images and types of databases. Our experimental results show that the proposed framework outperforms other attendance marking systems in terms of efficiency and ease of use and implementation. The proposed system is an autonomous attendance system that requires less human-machine interaction, making it possible to easily incorporate in a smart classroom. This project describes multiple attendance system using face recognition algorithm. An robust and efficient face detection based attendance system is implemented using deep learning algorithm. Face recognition widely implemented to recognize the face.*

*Keywords* Image editing, image gradient, mean value coordinates, Poisson equation, seamless cloning.

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## I. INTRODUCTION

Attendance marking is a regular activity in institutions and industries. Attendance is considered an important factor for both students and teachers in educational organizations. Managing student attendance in the classroom is a tedious job. Attendance systems are grouped into two broad categories i.e., manual and automated attendance systems. Among manual attendance systems, the most common is the roll call method, in which a teacher marks the attendance by calling out the names of the students one by one. This method is extremely out-dated, and in the case of a large number of students in a class, it can take more than 10 minutes each day and has the most number of chances for proxy attendance marking.

The second method is signing attendance on a register or attendance sheet. It is the most time-consuming method and it can easily be manipulated and forged if left unsupervised. It is therefore important to develop an automated attendance system to mark attendance efficiently automatically without any human intervention. Face recognition is the most viable solution for developing attendance systems as face recognition is considered the least intrusive method of identification, images can be captured from a distance, cost-effective solution, no chance of marking proxy attendance and it is a user friendly yet reliable method. In this paper, we developed an automated attendance system from videos captured from a camera and recording the attendance of the students through face detection and recognition.

## II. LITERATURE SURVEY

2.1Face Recognition Techniques: Reviewing different methods and algorithms used for face recognition in attendance systems, such as Eigenfaces, Fisherfaces, LBPH, deep learning-based approaches like CNNs, and their performance in real-

world scenarios.

2.2 Attendance System Design: Analyzing the architecture and design of smart attendance systems, including hardware components (cameras, sensors) and software components (databases, algorithms).

2.3 Data Preprocessing and Feature Extraction: Investigating techniques for preprocessing face images (e.g., normalization, alignment) and extracting relevant features for recognition.

2.4 Recognition Accuracy and Performance: Evaluating the accuracy and performance of face recognition algorithms in terms of identification rates, false acceptance rates, and computational efficiency.

### III. EXISTING SYSTEM

The use of image processing in attendance systems has led to various automatic attendance systems based on thumbprint scanning, iris scan, and face detection. Fingerprint scan based attendance systems were the first biometric attendance system.

Each student has a unique fingerprint that is scanned to mark attendance. The iris scan based attendance system exterminated the possibility of proxy attendance by fingerprint cards. This system scans the iris pattern of students to mark attendance. Face recognition is also widely used to identify the people in a large crowd or scene.

Attendance marking using face recognition is also being used in institutions. Face recognition, fingerprint, and iris scanning based attendance systems suffer from the limitations that they require more Human-Machine Interaction as only one student can mark attendance at a time and it is not feasible to use it in classrooms where a lot of students have to mark their attendance.

### IV. PROPOSED SYSTEM

In this work, we proposed an attendance system based on the principles of face detection and recognition, so that the system can take multiple attendances through a single input and thus increases the efficiency of the system while leaving no space for proxy attendance. The system starts by taking a group image of the class through a live video captured through a CCTV, then the faces are detected. The proposed system uses DCNN Algorithm for face recognition from group image. In the first step, face data collected from user by using OpenCV packages. More than 1000 images has been collected from the user. The collected data are preprocessed by four important steps which are, Gray scale conversion, Resizing, Normalization and Augmentation. The CNN architecture has been implemented and trained on the processed data. The trained model is stored and deployed in the automated face detection block. The developed model helps to identify the trained faces in accurate manner. If the face is identified, the attendance will be recorded. Once a student is recognized, it marks him/her present. The process is repeated a few times to increase system efficiency and the final results are recorded in the excel file. This automated attendance system saves the precious study time of the students as it runs in the background and needs little to no interaction from the teachers or the students.

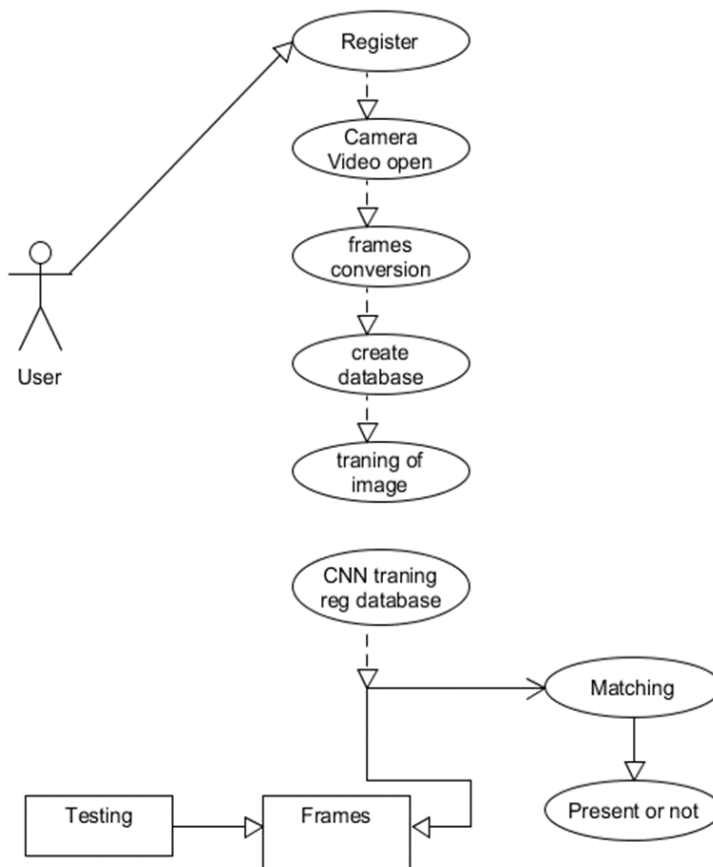
#### 4.1 Overview

The proposed app works in the following manner:

- **Data Acquisition:** The system utilizes cameras or webcam devices to capture images of individuals entering the premises where attendance is to be recorded.
- **Preprocessing:** The captured images undergo preprocessing techniques to enhance their quality and remove noise. This may involve tasks such as normalization, face detection, and alignment to ensure consistency in facial features.
- **Feature Extraction:** Relevant features are extracted from the preprocessed face images using techniques such as Local Binary Patterns (LBP), Histogram of Oriented Gradients (HOG), or deep learning-based methods like Convolutional Neural Networks (CNNs). These features represent unique characteristics of each individual's face.
- **Face Recognition:** The extracted features are compared against a database of known faces using a matching algorithm, such as the Euclidean distance, cosine similarity, or more sophisticated methods like Siamese networks or triplet loss functions. This step identifies individuals by recognizing their faces.

- **Attendance Marking:** Upon successful recognition, the system marks the attendance of the recognized individual in the database. This information can be stored locally or on a server for further analysis and management.
- **User Interface:** The system may include a user-friendly interface for administrators to monitor attendance records, manage the database of individuals, and configure system settings. It may also provide feedback to users about the recognition results in real-time.
- **Integration:** The attendance system can be integrated with existing infrastructure, such as school management systems or human resource management systems, to streamline attendance tracking and reporting processes.
- **Security and Privacy:** To ensure data security and privacy, the system employs encryption techniques to protect sensitive information, such as biometric data, during transmission and storage. Access controls and authentication mechanisms are implemented to restrict unauthorized access to the system.
- **Scalability and Performance:** The system is designed to scale efficiently to accommodate varying numbers of users and locations. Performance optimizations, such as parallel processing and hardware acceleration, may be implemented to enhance the system's speed and responsiveness.

**V. USE CASE DIAGRAM:**

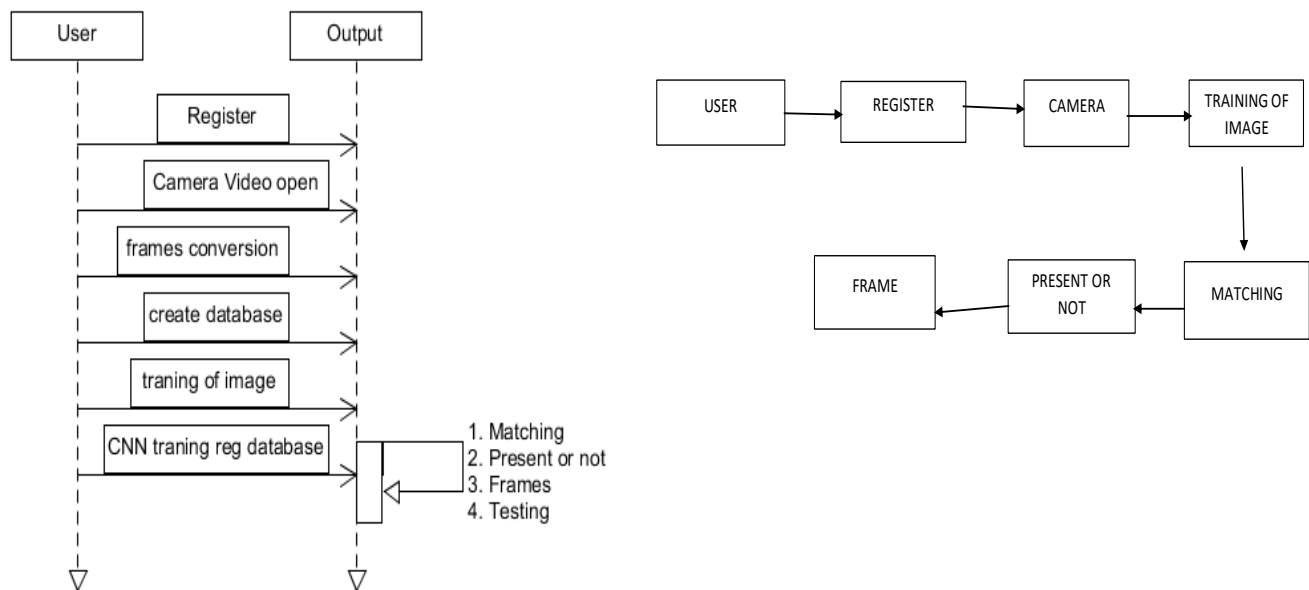


5.2 SEQUENCE DIAGRAM:

5.3 DATA FLOW DIAGRAM:

## VI. CONCLUSION

Automated Attendance System has been envisioned for reducing the drawbacks in the traditional (manual) system. This attendance system demonstrates the use of image processing techniques in classroom. The proposed automated attendance system using face recognition is a great model for marking the attendance of students in a classroom. This system also assists in overcoming the chances of proxies and fake attendance. In the modern world, a large number of systems using biometrics are available. However, the facial recognition turns out to be a viable option because of its high accuracy along with minimum human intervention. This system is aimed at providing a significant level of security. This system can not only merely help in the attendance system, but also improve the goodwill of an institution.



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