

# Online Classroom Attendance System With Multiple Face Recognition

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## **Abstract:**

*In this digital world automation is most effective and essential in all aspects. Getting and maintaining classroom attendance for every hour in a day at school or college by calling names and marking on book is very hectic and time-consuming, there are some chances of proxy attendance. There are many automated human identification techniques such as biometrics, RFID, voice recognition still those techniques some issues systems are vulnerable to proxies. But we are implementing **the multiple face recognition technique to get all candidate in single or multiple frames to get attendance conformation.** The algorithms are implemented using a series of signal processing methods including Harr-cascade classifier, Local Binary Pattern (LBP), Haar-like feature, facial image pre-processing and Principal Component Analysis (PCA). The Ada Boost algorithm is implemented in a cascade classifier to train the face and eye detectors with robust detection accuracy. Faces are detected and recognized from live streaming video of the classroom. Attendance will be updated student details with date and time to online database.*

**Keywords**—Face Recognition; Face Detection; Haar-Cascade classifier; Local Binary Pattern histogram; Principal Component Analysis.

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## **I. Introduction:**

The Online Classroom Attendance System with Multiple Face Recognition is an advanced technological solution designed to automate the process of attendance tracking in various settings, such as educational institutions, corporate offices, and events. This system leverages facial recognition technology to identify individuals and record their attendance in real-time, thereby enhancing accuracy and efficiency compared to traditional methods.

Image processing plays vital role in face recognition application that is capable of detecting, tracking, identifying or verifying human faces from an image or video captured using a digital camera. Although lot of progress has been made in domain of face detection and recognition for security, identification and attendance purpose. but still, we are implementing the same technique to get multiple Face recognition to get attendance conformation in mass or group in single or multiple frames. The challenging issues are variations in face size with varying camera distance in larger area.

## **II. Key Features Of The System Include:**

**Real-time Recognition:** The system can identify multiple faces simultaneously, allowing for quick and efficient attendance logging.

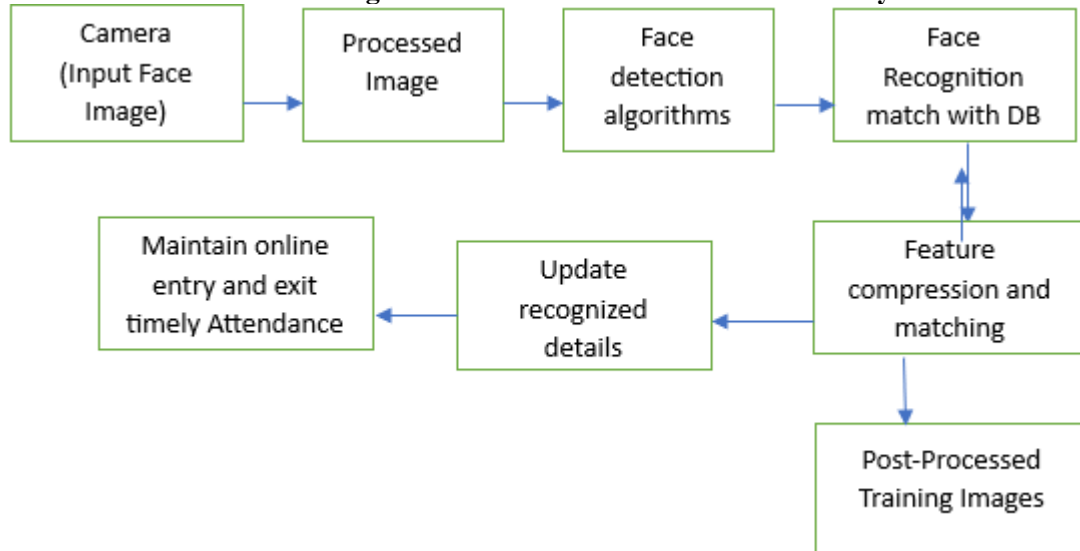
**User-Friendly Interface:** The online platform provides an intuitive interface for both administrators and users, facilitating easy access and management of attendance records.

**Data Security:** The system ensures that personal data is securely stored and processed, adhering to privacy regulations.

Integration Capabilities: It can be integrated with existing management systems for seamless operation and data synchronization.

Analytics and Reporting: The system can generate reports and analytics on attendance patterns, helping organizations make informed decisions.

### III. Block Diagram Of Online Classroom Attendance System.



### IV. Working Process:

Facial recognition is a technology capable of recognizing a person based on their face. It is blending with complex mathematical AI and machine learning algorithms which capture, store and analyse facial features in order to match with images of individuals in a pre-collected images in database and often.

Face detection algorithms usually start by searching for human eyes, one of the easiest features to detect. They then try to detect other facial landmarks, such as eyebrows, mouth, nose, nostrils and irises. Once the algorithm concludes that it has found a facial region, it performs additional tests to confirm that it has detected a face. The training improves the algorithms' ability to determine whether there are faces in an image and exactly where their boundaries are.

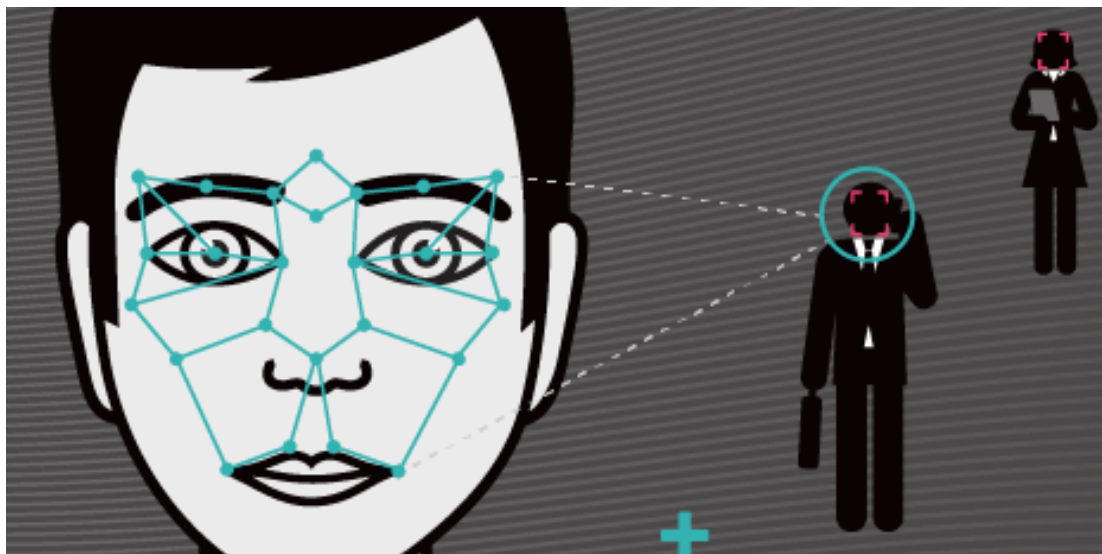


Fig. 1. The main facial features.

### V. Face Recognition Steps

Face detection: The first step is detecting a face within a larger image or scene. This process involves distinguishing facial features from the surrounding environment and pinpointing their location within the frame.

Face Analysis: Once a face is detected, the technology analyses the facial features. The **software reads your facial features** that play a role in the detection process can differ from each other based on what mapping technique the database and ML algorithm for facial recognition use. Commonly, those are either vectors or points of interests, which map a face based on pointers (one-dimensional arrays) or based on a person's unique facial features respectively. 2D and 3D masks are utilized for this process. It's common to think that key points are used for best facial recognition software, but in reality, they are not descriptive or exhaustive enough to be a good face identifier for this task.

Match Finding: Then the code is compared against a database of other face images. This database has photos with identification that can be compared. The technology then identifies a match for your exact features in the stored images database. It returns with the match and attached information such as name and ID or it depends on the information saved in the database of an individual.

Online Attendance update: An attendance tracker helps you manage a classroom, host a webinar, or conduct a workshop effectively. In this detailed guide, we'll show you step-by-step instructions on how to make attendance sheet in Google Sheets.

### VI. Result: Sample Copy Of Multiple Face Recognition Online Attendance System.



Fig. 2. Camera collected classroom\_image\_1

The fig.2. shows sample copy of class room camera collected image for making attendance, this camera image collection process will continue front to back very often to get whole class attendance in while. The number of students data will update in google sheet with their ID, login date and time as usual. Duplicate or multiple entry will be eliminated as database algorithm. The frame size number of faces identification depends on camera ant its resolution.

Stu_ID	Date	Login Time
189EC22005	20/10/2024	13:01:04
189EC22017	20/10/2024	13:01:04
189EC22003	20/10/2024	13:01:04
189EC22019	20/10/2024	13:01:04
189EC22008	20/10/2024	13:01:04
189EC22021	20/10/2024	13:01:04
189EC22036	20/10/2024	13:01:04

Fig. 3. Goggle sheet registered copy.

Fig. 3. is collected sample of registered candidate at one shot, as multiple images will give complete class room attendance.

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