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# Smart Time Slot Based Attendance Using Face Recognition

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**ABSTACRT:** Smart Time Slot Based Attendance using Face Recognition is an automated attendance management system that records student or employee attendance only within predefined time slots using facial recognition technology. The system reduces proxy attendance, improves accuracy, and saves administrative time..Face recognition based smart attendance system using IoT is a tool for recognizing the students face while taking attendance by using face biometrics based on monitor camera image capturing. In our face recognition based smart attendance project, a raspberry pi system will be able to find and recognize human faces fast and precisely in images. The long-established method of calling name of each student is tedious and there is always a chance of proxy attendance. The proposed system is based on face recognition to maintain the attendance record of students. As the process of attendance taking starts the system takes pictures of the attendees and then applies face detection and recognition technique to the given image and the recognized students are marked as present and their attendance is updated with corresponding time, student name and register number. We have used deep learning techniques to develop this project

**KEYWORDS:** facial recognition, attendance system, automation, Convolutional Neural Network (CNN), computer vision.

## I. INTRODUCTION

### 1.1 OVERVIEW

Education institutes these days are concerned about the consistency of students' performance. One explanation for this decrease in student performance is the inadequate attendance. The long-established attendance was taken manually that is incredibly time overwhelming and infrequently results in human error. The old technique that uses paper sheets for taking students' attendance will now not be used. This project aims for computer-based student attendance taking system that supports the institutions to keep records of attendance. We have proposed to implement a "Face Recognition based Smart Attendance System Using IoT". The present implementation includes facial identification that is time saving and eradicates the probabilities of proxy attendance due to the facial detection. This system will currently be utilized in a section during which participation plays a vital role. Raspberry Pi, Python and OpenCV are the basic requirements for this system. The system implementation uses webcam as input device to identify the face of the person in real-time.

This project on face recognition based smart attendance system using IoT aims to replace the manual attendance system with automated attendance system. As all the data is stored online in this proposed system, offline registers will become

irrelevant, making the maintenance of records easier. Nowadays attendance is considered as a prime factor for both the students and the educational institution.

Manual attendance is considered as a time-consuming process or sometimes it happens for the teacher to miss someone or students may answer multiple times on the absence of their friends (proxy attendance). Biometric attendance is automated method of verifying or recognizing the identity of a living person on the basis of some physiological characteristics, such as fingerprints or facial features, or some aspects of the person's behavior. Since biometric systems determine someone by biological attributes, they are tough to forge. Face recognition is one among the few biometric ways that has the veracity of a physiological approach while not being intrusive. Face Recognition is a type of biometric software that maps an individual's facial features mathematically and stores it as a face print. The system uses deep learning techniques to compare a live capture or digital image to the stored face print in order to verify an individual's identity. Once the recognized face matches a stored image, attendance is marked in corresponding excel sheet for that person. The other reason for taking face recognition as biometric parameter is this technology reduces the physical touch of objects/records providing a contagious-by-touch free environment which the whole world is adopting these days. Automated attendance system using machine learning approach automatically detects and recognizes face and marks attendance which saves time and maintains a record of the collected data.

### 1.2. Objectives

The main objective of the Smart Time Slot Based Attendance System using Face Recognition is to develop an automated, secure, and time-restricted attendance management system that accurately records attendance using facial recognition technology within predefined time slots.

- To automate attendance recording using real-time face detection and recognition techniques.
- To implement time slot validation, ensuring attendance is marked only within authorized time intervals.
- To eliminate proxy attendance by verifying the identity of individuals through biometric facial features.
- To maintain a secure and centralized database for storing attendance records with date and time stamps.
- To improve punctuality monitoring by restricting attendance marking after the defined slot period.
- To generate automated attendance reports (daily, weekly, monthly) for easy analysis.
- To reduce manual effort and paperwork, increasing efficiency and accuracy in institutions and organizations.

### 1.2

### 1.3 Problem Statement

Traditional attendance systems used in schools, colleges, and organizations rely heavily on manual methods such as paper registers, ID card scanning, or RFID-based systems. These methods are time-consuming, prone to human errors, and susceptible to proxy attendance. Additionally, they lack proper time validation mechanisms, allowing individuals to mark attendance outside the permitted schedule.

In many institutions, there is no automated mechanism to ensure that attendance is recorded strictly within predefined time slots. This leads to issues such as late attendance marking, inaccurate punctuality tracking, and difficulty in maintaining transparent attendance records.

## II. LITERATURE SURVEY

### 1. ATTENDANCE MONITORING USING FACE RECOGNITION

**Author-** Dr.Kalpana S,Godwin Bright M,Raju Kumar R, Swarna Preetha R  
Year-2023

In a changing environment, automatic facial recognition technology has advanced significantly. Smart Attendance with Real Time Face Recognition is a practical solution that helps with managing the student attendance system on a daily basis. The technique of recognizing a student's face for collecting attendance using facial biometrics based on high-definition monitor footage and other information technology is known as a face recognition-based attendance system. In the face recognition project, a computer system will be able to quickly and accurately locate and identify human faces in pictures or videos being recorded by a security camera. The current issue with attendance tracking is that if the image that was collected doesn't match the student's face in the database, it is stored as a new image. In order to address the drawbacks of the proposed system, the student's face must be captured in a way that allows all of the student's facial features to be detected, as well as the student's seating and posture. Many algorithms and methods have been created to enhance facial recognition ability, however deep learning is the idea that will be used in this case.

**2. Real-Time Attendance System Using Facial Recognition And Web-Based Integration****Author** -Om Kale,Dhruv Kharat,Sairaj Babar.

This paper presents the development of an AI-powered facial recognition attendance system designed for educational institutions and professional environments. The system leverages OpenCV and Flask for real-time face detection and recognition, automating attendance tracking with high accuracy and efficiency. The architecture includes a web-based interface using Flask and a desktop-based Tkinter application, enabling flexible deployment. Facial recognition is performed using pre-trained deep learning models, where detected faces are compared against a stored database for identification. The system supports live video processing as well as image-based verification, allowing attendance to be logged seamlessly. Attendance records are automatically stored in CSV files, ensuring real-time accessibility and minimal human intervention. Through testing under varied lighting conditions and angles, the system demonstrates robust performance.

**3. Face Recognition based Smart Attendance System Using IoT****Author**-Krishna Pandit1, Sahil Goge2, Sakshi Narwade3, Dr. Sarita Sanap

Face recognition based smart attendance system using IoT is a tool for recognizing the students face while taking attendance by using face biometrics based on monitor camera image capturing. In our face recognition based smart attendance project, a raspberry pi system will be able to find and recognize human faces fast and precisely in images. The long-established method of calling name of each student is tedious and there is always a chance of proxy attendance. The proposed system is based on face recognition to maintain the attendance record of students. As the process of attendance taking starts the system takes pictures of the attendees and then applies face detection and recognition technique to the given image and the recognized students are marked as present and their attendance is updated with corresponding time, student name and register number. We have used deep learning techniques to develop this project.

**III. PROJECT DESCRIPTION****EXISTING SYSTEM**

The present system of taking attendance is either by manual or by using finger impression as biometric parameter. Manual /Traditional attendance is usually taken by calling students by name which takes a lot of time and has a chance of errors and proxies which makes the analysis of student performance imprecise. The maintenance of record for this type of attendance is time consuming and resource consuming. Attendance by using finger impression as biometric parameter is done by taking finger print as biometric parameter which is in use in many places, which may not be a time-consuming process compared to manual attendance, however, keeping the recent pandemic in mind it is not safe to touch the finger print recognition sensor repeatedly without a huge time gap. Also, this type is high maintenance. So, there is a need for new attendance system which has no lecturer interference and has a contactless device

**Disadvantages****1. High Initial Setup Cost**

Installation of high-quality cameras, servers, and software development may require significant investment.

**2. Dependence on Lighting Conditions**

Poor lighting or shadows can reduce face recognition accuracy and lead to misidentification.

**3. Privacy Concerns**

Storing facial biometric data may raise privacy and data security concerns among users.

**4. Accuracy Issues**

Changes in appearance (mask, beard, hairstyle, glasses) may affect recognition performance.

**PROPOSED SYSTEM**

The use of smart attendance system facial recognition is an innovative way to prevent and automate attendance issues in educational institutions and workplaces. Traditional access systems, which rely on handheld or RFID playing cards, are time-consuming, slow, and often proxy attendance Our program uses advanced facial recognition technology as attendance provide a simple, green, and relatively accurate management solution. This machine employs cutting-edge computer imaginative and prescient techniques and tool mastering algorithms to come upon and apprehend faces in actual-time. Utilizing a camera set up on the access points of school rooms or offices, the machine captures pics of people as they enter the premises. These images are then processed the use of facial recognition software program to in

shape in opposition to a pre-enrolled database of legal faces. Upon successful identity, the attendance is routinely recorded within the device, casting off the need for manual intervention. The first approach follows five sections which are face detection, data preprocessing, data training and, face recognition using AI through which attendance will be marked. Key capabilities of the Smart Attendance System consist of high accuracy in face detection and popularity, real-time attendance logging, and sturdy safety to shield touchy information. Additionally, the gadget can generate complete reports and analytics, offering insights into attendance styles and traits.

### ADVANTAGES

#### 1. Contactless and Hygienic

The system uses facial recognition, eliminating the need for physical contact like fingerprint scanners.

#### 2. Prevents Proxy Attendance

Facial features are unique to each individual, reducing the chances of fake or proxy attendance.

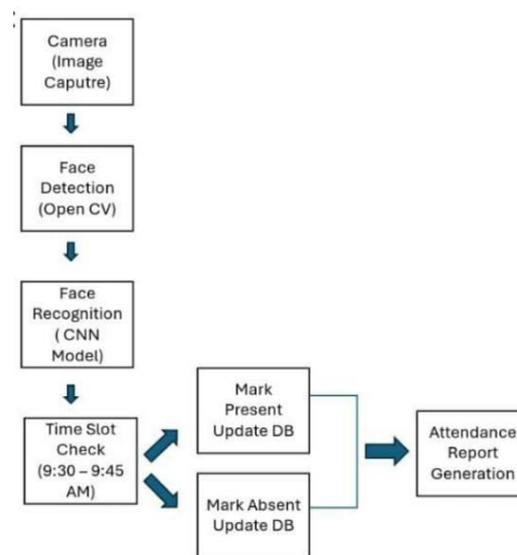
#### 3. Time Slot Control

Attendance is marked only within predefined time slots, ensuring punctuality and discipline.

#### 4. High Accuracy

Advanced face recognition algorithms provide accurate identification when properly configured.

### Block Diagram



### Working Principle

Smart Time Slot Based Attendance using Face Recognition is an automated system that records attendance using facial recognition technology within predefined time slots. It ensures that attendance is marked only when an authorized individual is present during the allowed time period.

This system improves security, accuracy, and efficiency in schools, colleges, offices, and organizations.

To design and develop a contactless, automated attendance system that uses face recognition technology and validates attendance based on predefined time slots to prevent proxy entries and late attendance marking.

Traditional attendance systems are manual, time-consuming, and prone to errors and proxy attendance. They also lack strict time validation. There is a need for a smart system that automatically verifies identity and allows attendance only within scheduled time slots.

- The camera captures the live image of the person.
- Face detection is performed using computer vision.

- The system compares the detected face with registered faces in the database.
- The current time is checked against the predefined time slot.
- If the person is recognized and the time is valid, attendance is marked.
- Attendance data is stored in the database with date and time stamp.

Management of attendance is a fundamental component of classroom assessment. Traditionally, manual processes, such as roll calls or attendance sheets, which are time-consuming and susceptible to errors. This paper proposes a smart attendance system that uses facial recognition technology to improve and optimize attendance tracking in educational institutions. Using advanced techniques like convolutional neural networks which is an algorithm specifically for deep learning that uses layers to perform convolution, activation, pooling, and other processes. CNN is used for object recognition tasks, such as image classification, detection, and segmentation, the system captures student images using high-definition cameras and compares them with pre-recorded data to mark attendance accurately. The system automatically updates the attendance records in a central database for administrative use. This smart and real-time method reduces human intervention, minimizes time waste, and eliminates errors, offering a reliable scalable solution for attendance management. By integrating emerging technologies like computer vision, this approach not only improves the attendance process but also establishes a foundation for enhancing overall organizational efficiency.

Accurate and efficient attendance management is a crucial element of administrative operations in educational institutions and organizations. Traditional attendance methods, such as manual roll-call or paper-based logging, are time consuming and prone to errors, such as proxy attendance and misidentification. Recent advancements in artificial intelligence and computer vision have introduced automated solutions like facial recognition-based attendance systems. These systems employ biometric methods, including the Haar Cascade classifier and LBPH algorithms, to test and recognize unique facial features, facilitating real-time and precise attendance tracking. By incorporating machine learning, these systems eliminate the help of humans and offer additional benefits, such as scalability, improved security, and seamless data management. Furthermore, they generate detailed reports and track attendance patterns, aiding decision-making processes. Although challenges related to privacy and data security must be addressed, smart attendance systems present a transformative alternative to old methods, offering substantial time savings, improved accuracy, and reduced administrative workload.

#### **IV. CONCLUSION**

This research presents an innovative solution to the challenges of traditional attendance management systems by utilizing facial recognition technology. By integrating advanced computer vision technique, CNN is an algorithm that uses layers to perform convolution, activation, pooling, and other processes. CNN is primarily used for object recognition tasks, such as image classification, detection, and segmentation, for face recognition, the proposed system provides an efficient, accurate, and scalable alternative to manual attendance. The system achieved a high accuracy rate of 94.7 percent and demonstrated fast processing times, making it suitable for real-time applications in educational and organizational environments. The system's automated functionality significantly reduces the likelihood of human error, streamlines the process by saving time, and addresses common challenges like proxy attendance. Additionally, its contactless operation is highly advantageous, particularly in addressing health concerns in the aftermath of the pandemic, highlighting its modern-day relevance. Though limitations are present such as maintaining performance under diverse lighting conditions and addressing privacy concerns, the system demonstrates its effectiveness as a reliable attendance management solution. In conclusion, the adoption of recognition of faces for attendance systems marks a notable advancement in automating administrative processes.

#### **V. FUTURE ENHANCEMENT**

Face recognition based smart attendance system using IoT is a tool for recognizing the students face while taking attendance by using face biometrics based on monitor camera image capturing. In our face recognition based smart attendance project, a raspberry pi system will be able to find and recognize human faces fast and precisely in images. The long-established method of calling name of each student is tedious and there is always a chance of proxy attendance. The proposed system is based on face recognition to maintain the attendance record of students. As the process of attendance taking starts the system takes pictures of the attendees and then applies face detection and recognition technique to the given image and the recognized students are marked as present and their attendance is

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#### REFERENCES

- [1] Bussa, Sudhir & Mani, Ananya & Bharuka, Shruti & Kaushik, Sakshi. (2020). "Smart Attendance System using OPENCV" based on Facial Recognition. International Journal of Engineering Research. V9. 10.17577/IJERTV9IS030122.
- [2] S. Huang and H. Luo, "Attendance System Based on Dynamic Face Recognition," 2020 International Conference on Communications, Information System and Computer Engineering (CISCE), Kuala Lumpur, Malaysia, 2020, pp. 368-371, doi: 10.1109/CISCE50729.2020.00081.
- [3] Al-Muhaidhri, Ghalib. (2019). "Smart Attendance System using Face Recognition". International Journal of Engineering Research and. V8. 10.17577/IJERTV8IS120046.
- [4] A. Shetty, Bhoomika, Deeksha, J. Rebeiro and Ramyashree, "Facial Recognition using Haar Cascade and LBP Classifiers", 2021.
- [5] Chintalapati, Shireesha&Raghunadh, M. (2013). "Automated attendance management system based on face recognition algorithms". 1-5. 10.1109/ICCIC.2013.6724266.
- [6] M. Z. Khan, S. Harous, S. U. Hassan, M. U. Ghani Khan, R. Iqbal and S. Mumtaz, "Deep Unified Model For Face Recognition Based on Convolution Neural Network and Edge Computing," in IEEE Access, vol. 7, pp. 72622- 72633, 2019, doi: 10.1109/ACCESS.2019.2918275.
- [7] M. Arsenovic, S. Sladojevic, A. Anderla and D. Stefanovic, "FaceTime — Deep learning based face recognition attendance system," 2017 IEEE 15th International Symposium on Intelligent Systems and Informatics (SISY), 2017, pp. 000053-000058, doi: 10.1109/SISY.2017.8080587.
- [8] S.Sreesuba, G. Anitha, A.Irumporai, S.Usha, P.Sunitha Devi, "Facial Recognition based Attendance Marking System ", Annals of RSCB, pp. 6452 –, Apr. 2021.
- [9] Venkata Kalyan Polamarasetty<sup>1</sup>, Muralidhar Reddy Reddem<sup>2</sup>, Dheeraj Ravi<sup>3</sup>, Mahith Sai Madala<sup>4</sup>, " Attendance System based on Face Recognition" International Research Journal of Engineering and Technology (IRJET) e-ISSN: 2395-0056 Volume: 05 Issue: 04 | Apr-2018 www.irjet.net p-ISSN: 2395-0072
- [10] Kar, Nirmalya, et al. "Study of implementing automated attendance system using face recognition technique." International Journal of computer and communication engineering 1.2 (2012): 100.
- [11] A. Arjun Raj, M. Shoheb, K. Arvind and K. S. Chethan, "Face Recognition Based Smart Attendance System," 2020 International Conference on Intelligent Engineering and Management (ICIEM), London, UK, 2020, pp. 354-357, doi: 10.1109/ICIEM48762.2020.9160184.
- [12] F. V. Massoli, G. Amato, F. Falchi, C. Gennaro and C. Vairo, "CNN-based System for Low Resolution Face Recognition" Conference: 27th Italian Symposium on Advanced Database Systems, AIMIR Research Activities 2019. (2019)
- [13] K. He, X. Zhang, S. Ren and J. Sun, Deep Residual Learning for Image Recognition, 2016 IEEE Conference on Computer Vision and Pattern Recognition (CVPR), Las Vegas, NV, (2016), 770-778
- [14] Joseph, Dona. (2020). Automatic Attendance System using Face Recognition. International Journal for Research in Applied Science and Engineering Technology. 8. 769-773. 10.22214/ijraset.2020.30309.



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