Digital Attendance Register with Face Recognition

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Abstract

Regular attendance is compulsory for success of every student, but old methods like calling the names and attendance taking is more time consuming. Now a days it is very helpful for the teachers, this digital attendance system takes less time to record attendance. This paper proposes a face recognition attendance system using Computer Vision technology to solve these problems. By using cameras and face recognition, the camera can automatically capture and take student attendance and we use Convolutional Neural Network (CNN) for image processing. This method works faster, and it is accurate, and gives real-time updates, helping teachers to track student details. Additionally, it gives reports on student attendance, enabling administrators to identify and solve attendance-related problems. Overall, this system streamlines attendance management and enhances student outcomes.

Keywords: Computer Vision Technology, Convolutional Neural Network (CNN), Haar-Cascade and LBPH algorithms.

1. Introduction

The digital attendance register with face recognition uses smart face recognition technology. At first, we have to develop a system that improves the efficiency and accuracy of attendance tracking in given environments; by combining deep learning algorithms, the system will take photos automatically and match facial features with a stored database, enabling identification of a particular student. In today's education system, maintaining proper attendance records is useful for accountability and optimizing learning or work environments. Old methods like manual taking the attendance can take more time. this project proposes the digital attendance register with facial recognition technology. Face recognisation technology require more advanced algorithms and cameras to identify students based on their unique face features. This work not only achieve in attendance tracking work but also give security. By taking images, the camera detects the face and then the system will mark attendance without taking the names manually. This technique eliminates the manual documentation and give proper information to the administrators. We are using Python programming and tools like OpenCV, this project needs to develop a accurate facial recognisation attendance system and it must be of less cost, It mainly focus on face recognition. This work is useful for the education purposes, this technology requires less cost and it helps mainly to the teachers, The old technique of manually taking attendance consume more time, this digital attendance register with face recognisation consume less time, it maintains documentation of a particular student it is very helpful in student progress tracking. At first, we have to take details and photo of all students then train the dataset to recognize students, it detects student based on face recognisation and then record it every day, Documentation must be needed for this method.

2. Literature Survey

This work conducted on digital attendance register with face recognisation reveal a wide range of research papers exploring different aspects of system design, optimization, and implementation. [1] Bhattacharya, G, Nainala, Das and Routray Presented Smart Attendance System using Face Recognisation for educational purpose, this includes advanced Technology for face recognisation

and documentation. [2] Srivastava, M. Kumar, S. Dixit and R. Kumar take. survey on real time attendance system using face recognisation, this helps in taking attendance based on time. The advanced technology helps to capture the face and take attendance based on time. [3] John, K. and Grace focused on smart attendance system with GSM notification, this paper explains that the attendance is taken using face as the biometric and this information is stored in database. If the student attendance is marked using face recognisation, Then the message will be sent to the parents using notification. [4] Samridhi Dev and Tushar Patnaik at developing a face recognisation system for students' attendance in order to produce Excel reports with the help of complex image processing computations with enhanced accuracy and passes the scrutinizing test in different conditions. Moreover, formational attendance arrangements should be easier, cheaper, and safer with the assistance of the system. [5] Hartanto and M. Adji made survey on face recognisation attendance system, face recognisation is notable features as it can be passively utilized compared to other methods. In this study, an automatic face detection and recognisation involves four stages and skin color detection, Haar cascade, and LBPH algorithm. [6] Nandhini S, Duraimurugan R, and P Chokkalingam made survey about Real-time face recognisation attendance system, Real-time face recognition have been elevated and as a result, there is a solution for tracking the student's attendance through automatic face recognition (AFR). In this project, the program focuses on the use of deep learning to identify students faces from surveillance videos and consequently update and record the attendance without delay. [7] Smitha, & Hegde, Pavithra & Afshin Explain about facial identification, Facial identification is utilized in security and identification sections since it is non-contact even though it is comparatively less accurate than iris or fingerprints. this technic will take care of class attendance by identifying faces using Haar-Cascade and LBPH algorithms on live video student capture and send attendance details to staff members through e-mail. [8] A. R. Salim, R. Olanrewaju and A. Balogun designs an Automated Class Attendance System with Face recognisation enabled door access control to be executed on Raspberry Pi installed with camera and display.

Used for capturing student images to match with a dataset, for opening the door if identified, and attendance recording in a MySQL database having 95% algorithm accuracy based on the Local Binary Patterns. [9] Shizhen Huang and Haonan Luo presented real time face recognisation attendance system realized with higher phases of algorithms and executed with TensorFlow and Qt. Combining from the result, we understand that this kind of real time face recognisation attendance system works properly and it can be as a solution for saving and consuming time for different sectors. [10] Hao Yang, Xiaofeng Han focused on face recognisation attendance system through real time image processing is in the experimental stage with accuracy of 82% and there are definite advantages of cutting truancy and increasing class efficiency over conventional system. This technology improves attendance tracking, and therefore, portrays the potential in the larger market domain.

3. Proposed System

The proposed system automates the attendance process by leveraging face recognition technology, designed to streamline and secure the logging and displaying of student's attendance. This system is composed of three main components: Student Registration, Attendance Logging, and Attendance Display.

3.1 Student Registration

The Student Registration component focuses on capturing and saving essential student details such as name, ID, and photos. This process involves using a webcam to capture a photo of each student, which is then stored in a designated directory with a unique identifier based on the student's ID. Alongside the photos, student details are recorded in a CSV file (student_details.csv). This ensures that the system has a comprehensive database of students, linking their images to their respective details.
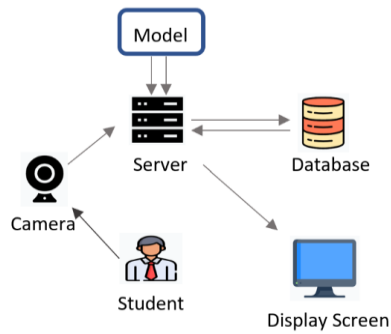
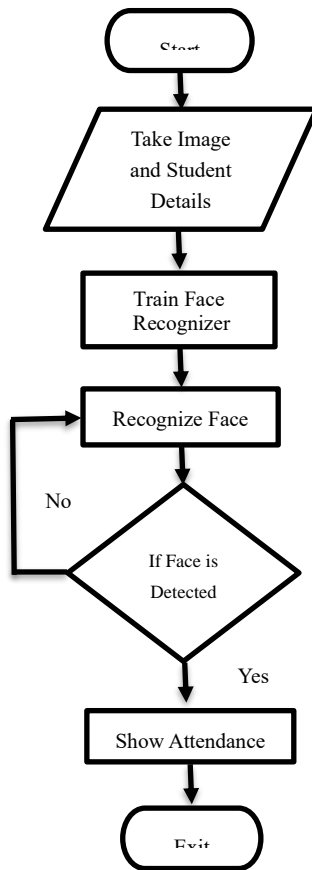*Figure 3.1:Overview of the proposed System*

Figure 3.2: Overall Architecture

3.2 Attendance Logging

Attendance Logging is the core functionality of the system, responsible for recognizing student faces and logging their attendance accurately. This component preprocesses and detects faces from the captured images, followed by training a face recognizer with these images. In real-time, the system uses the trained face recognizer to detect student faces via a webcam feed. When a student is recognized, their attendance is logged into a CSV file

(attendance.csv). This automated process reduces manual errors and ensures a seamless logging of attendance.

3.3 Attendance Display

The Attendance Display component is designed to present the logged attendance records in an easily accessible format. By reading from the attendance.csv file, the system displays the attendance data in a user-friendly manner, allowing administrators and teachers to quickly view and verify the attendance records. This component ensures transparency and easy access to attendance data.

4. Result and Discussion

The proposed face recognisation system for attending management successfully extracts the student details, trains the face recognizer, and then mark attendance with high efficiency. Although the recognition of students and the update to the attendance sheet work well and quickly, the range of recognition can actually be extended where the dataset is at least 50 images per student. The system is good in real time application but it shows poor performance when illuminated light is not constant and the face images are not clear.

5. Conclusion

Overall, the proposed system offers an efficient, automated solution for managing student attendance through face recognition. By integrating the Student Registration, Attendance Logging, and Attendance Display components, the system provides a streamlined and secure method for capturing, logging, and viewing attendance records. This not only enhances the accuracy of attendance tracking but also simplifies the process for educational institutions.

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