

Intelligent Attendance Management System using Facial Recognition in University Classrooms

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Abstract— The science of artificial intelligence has made considerable advancements in recent years. In the paper that has been given, a face recognition-based setup for automatic attendance marking has been suggested. The technology that is being used creates an excel sheet in addition to recording attendance. This technology also successfully recognizes faces coming from various angles. The facial images are first taken using an HD 1080p camera, and after noise reduction, the histogram-oriented gradient (HOG) technique is utilized to find the fascial features. This system uses the Dlib face recognition API, which has a 97.38% face recognition accuracy. The system can identify every student in the frame and record every one whose features match those in the database. The device that is being used can also recognize a student's face from various angles. This method can also be used to create a fully secure surveillance system based on the idea of facial recognition in a particular organization.

Index Terms— Dlib; Attendance; Face Recognition; and Histogram of Oriented Gradients.

I. INTRODUCTION

The most effective and trustworthy method for identifying student using their biometrics is face recognition technology [1]. Such a method can be used in the educational sector to control student attendance. Maintaining the attendance records of a big number of student in a classroom with more than 100 students becomes exceedingly challenging [2]. Furthermore, taking manual attendance is a laborious and time-consuming operation. By identifying the faces of the class members, we may successfully build this face recognition-based system to track attendance. Students will demonstrate satisfactory performance in their exams in this manner because, according to a survey, just 18% of students show 100% attendance in class, compared to 71% who are occasionally absent from school and 11% who are consistently absent [3]. In today's academic environment, regular attendance is crucial for performance evaluation and quality control. There are various issues with the manual attendance marking system of students in the lecture hall in various institutions. For instance: 1. The teacher calls out each student's name one at a time, which takes a lot of time and cuts into lecture time when taking attendance. 2- In a classroom with a big number of students, it is exceedingly challenging for the teacher to pay attention to every student when recording attendance in order to prevent fraudulent attendance, making this method of recording attendance chaotic. 3. Transferring the attendance record to a computer data base is challenging since the paper used for attendance is readily damaged. [4].

II. RELATED WORK

In recent years, a variety of attendance management systems have been put forth to address the issues with manual attendance, such as time, proxies, and data records. Consider a fingerprint identification-based attendance management system where the attendance is marked using a fingerprint scanner. On the classroom door is a finger print scanner, which is used by each student individually while the teacher watches [7]. On the basis of Daugman's algorithm, a wireless Iris scanning-based attendance system has been presented. This wireless system uses biometric identification to verify users [8]. A radio frequency identification (RFID) and GSM (global system for mobile communication) based attendance marking system was established in [9]. However, this approach makes it necessary for each professor and student to have a distinct RFID card, which students can lose or swap. As a result, there is still a risk for inaccurate outcomes [9]. It has been suggested to use a BLE (Bluetooth Low Energy) based attendance system, but this system requires all students to have android devices. This system's fundamental flaw is that students can register their attendance from outside of class as long as they are in the BT device's coverage area [10]. Although each of the aforementioned solutions is a clever replacement for manual attendance, each system has its own

drawbacks [11].

III. THE PROPOSED MECHANISM

Through a camera, this technology records a picture of the student. and after that, our Face Recognition System (FRS) receives this image as an input. The camera must be set in a suitable location where it can easily and without additional adjustment capture an image of a face. The camera used for this purpose has a resolution of 1080p. The image is changed from a BGR to an RBG after being captured. Utilising Histogram of Orientated Gradients (HOG) [13], the following image is encoded. Our face recognition system (FRS) compares the features it has collected from the fascial images to a database. All kids whose face landmarks match those in our database are marked as present by FRS. In order to create a facial database, the system must first get the information on facial features. The technology will then utilise this facial data to identify students faces that were photographed during the presentation.

IV. PERFORMANCE EVALUATION

Images of two distinct student doing several complex face actions are seen. The results of the students attendance in three different time slots are shown. After capturing the frames, the system recognizes the students and records their attendance according to the face recognition percentage in each frame. This figure also tells us about the behavior of the students by indicating whether anyone is arriving late or departing early. We use high-definition cameras to boost system efficiency because they increase image frame size and pixel quality, allowing the system to recognize even tiny faces.

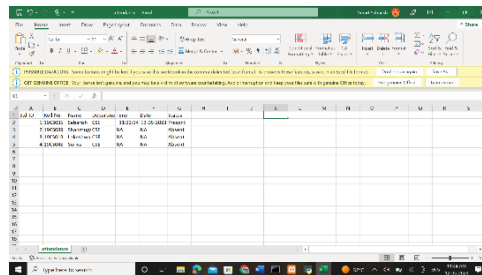


Fig.1 Excel Sheet

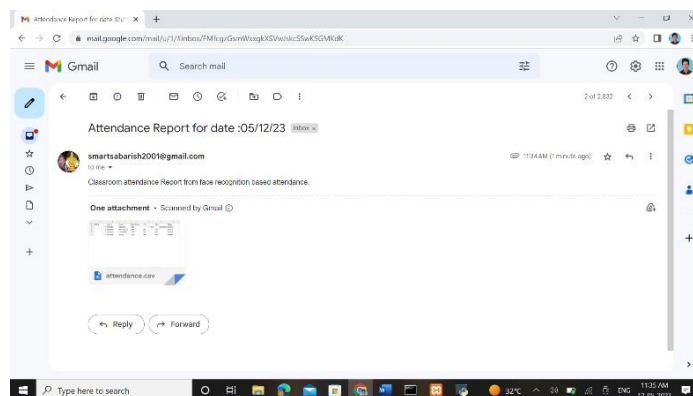


Fig.2 E-Mail Notification

Table 1. PERFORMANCE EVALUATION

Case No	Present Faces	Detected Faces	Recognized Faces	False Recognition	Efficiency of Recognition
1	20	20	14	6	69.23%
2	30	30	23	7	76.92%
3	53	53	50	3	94.28%

V. CONCLUSION

With a big number of pupils, manually managing the attendance records is exceedingly challenging. This is the reason an automatic facial recognition-based method for recording attendance has been introduced in this study. Using a pretrained model and the Dlib library, a system has been developed that successfully recognizes the student faces in the frame.

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