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A Web Application for Student Attendance Systembased on Facial Recognition

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Abstract: *The attendance monitoring is one of the common daily activities in schools and colleges. The conventional method of attendance marking is, the faculty makes the roll call and students respond either by raising the hands or just says present. As this process consumes more time and also increases the staff's effort. To overcome this problem attendance marking using facial recognition is developed. This is a web – based application, where the staffs and students can monitor and view the data remotely. The facial data of the students are stored in the database which is used at the time of facial recognition for attendance marking. The haar cascading algorithm is used in the system for facial recognition and detection. The admin, faculty, staff and parents are the main members found in the system. The admin is responsible for registering both faculty and students. The faculty can view the attendance status of the student through the system and also responsible for marking the attendance based on date and subject. Both the students and their parents can also view the attendance details through the system and also receives a pop – up message when the student's attendance percentage is less than 75% when logged in to the system. Through this application students can also submit the duty leave form and when the request is approved by staff advisor, HOD and Principal, attendance for that particular student is updated to the system*

Keywords: Attendance Monitoring, Facial Recognition, Haar Cascading, Duty Leave.

I. INTRODUCTION

Face Recognition is a biometric recognition technique. Maintaining and recording the attendance is very much important in educational institutes. Attendance marking using face recognition is a new innovation, this application doesn't need students' interaction for marking and storing the attendance records. Traditionally attendance is marked by the faculty, manually by calling the students name or make a roll call, for that students respond either by raising their hand or just say present. This method consumes more time and also energy. Here comes the importance of face recognition-based attendance system. By using this system, camera is used to capture the students face image and for recognition part the system will compare the current captured face image with already stored data in the database. If face image of student matches, then attendance for that particular student is updated in the system. Otherwise, an error sound is heard. Duty leave requests can also be sent through the system which can save faculty as well as students time.Through the system students can track the duty leave request. The request can be approved by staff advisor, HOD and Principal. Each faculty can either give approval to the request or can reject the request due to any valid reason. Then thestudent can sort out the issue and resubmit the request. If the request is approved by staff advisor, HOD and Principal, then attendance for that particular student is updated in the system.

II. LITERATURE REVIEW

Facial recognition can identify human faces in an images or videos, this can be determined by comparing the captured face image and images in the dataset to determine the image belongs to the same person. Because of the emergences of large number of software technologies, there are different methodologies used for marking attendance. Each system differs by the core technology which used. In [1], the system is an application which is designed to track and record the attendance of the students inside the classroom. In the paper [2], a camera and contactless infrared temperature sensors are used to get the temperature of the user. If the temperature calculated is between 30-35%, then student is allowed to

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enter into the class. In [3] the system is developed using OpenCV and the algorithm used is PCA (Principal Component Analysis). In [4] the RF-ID technology is used to develop attendance system. A tag and reader are needed to recognize the user. After authenticate the user successfully, then attendance is successfully updated in the system. In [5], by using the system after successful recognition, a message will be sent to the students who are absent in the class using GSM module.

III. SYSTEM DESIGN

3.1 Face Detection by Haar Cascaded Classifier.

Haar cascade is an algorithm that can detect objects in an image, irrespective of their scale in image and location. This algorithm is not so complex and can run in real-time. Haar cascading are commonly used for human face detection, eye detection and vehicle detection. The algorithm uses edge or line detection features, proposed by Viola and Jones in their research paper "Rapid Object Detection using a Boosted Cascade of Simple Features" published in 2001. The algorithmuses large number of positive images consisting of faces, and a lot of negative images which doesn't consist of any faceto train. The model created from this training is available at the OpenCV GitHub repository. The repository models are stored in XML files, and this can be read using OpenCV methods.

3.2 Face Recognition Stages

The Face Recognition stages are divided into following stages.

- **Creation of Dataset:** Multiple images of each student are captured using the web – camera. The captured images are pre-processed and then cropped the Region of Interest, which is used during Recognition process.
- **Face Detection:** Face detection is performed using Haar Cascade Classifier with OpenCV. Haar Cascade algorithm needs to train the captured image before the facial detection. This is called feature extraction.
- **Face Recognition:** Three steps in facial recognition are capture the image, train the captured image and finally prediction. The captured image is stored in the dataset and assigning a unique ID to each individual. This ID is mapped with the data of the individual which is stored in the database. When the user request for recognition, the facial image of the individual is captured. The image is then compared with the data in the database and produces the necessary output. After comparison, if the data's found match the attendance for the particular individual is updated. Otherwise, absent is recorded.

3.3 Hardware Specification

- Intel processor i3 and above
- 4 GB RAM
- 256 GB hard disk
- Web camera

3.4 Software Requirements

- Python
- OpenCV Framework
- Windows Operating System

IV. SYSTEM DESCRIPTION

Admin, Faculty, Student and Parent are the major members found in the system. Admin is responsible for enrolling all the faculty and students into the system. The registration part of the student is completed only when their facial images are captured using the web- camera. After capturing the image, these images are trained and stored into the dataset. Each individual has assigned a unique ID, these ID is mapped with their corresponding data in the database. When the user request for facial recognition, by using the web camera the facial image of the individual is captured. The captured image is then compared with the data in the database. After comparison, if the data's matches, then corresponding result is updated. The users can view the result using the web-based application. Through the system,

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the students can submit the request for duty leave. When this request is approved by the staff advisor, HOD and Principal then attendance for that particular individual on that particular date is updated.

V. RESULTS

The Student Attendance System using Facial Recognition is a web-based application. The main members found in the system are Admin, Faculty, Student and Parent. The following are the pages found in each of the user.

ADMIN

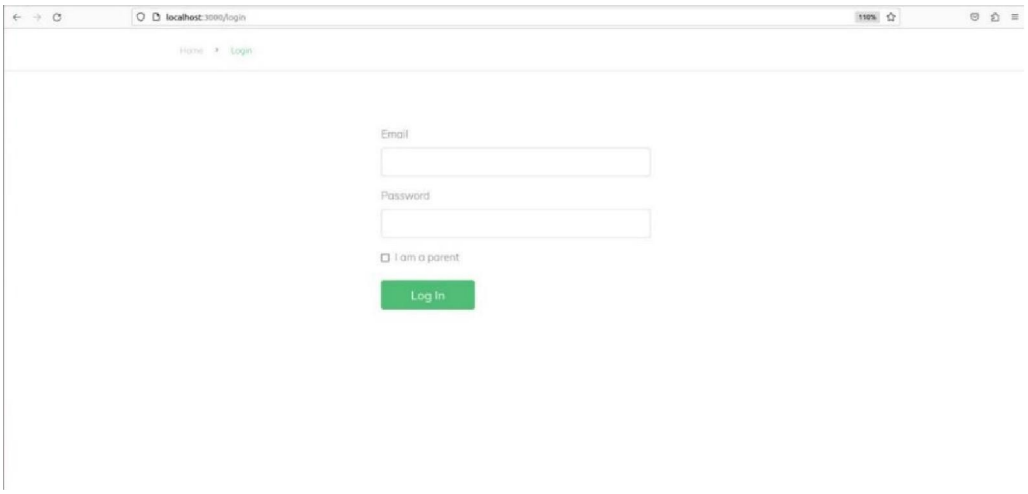

Fig. 1: Login Page for Admin

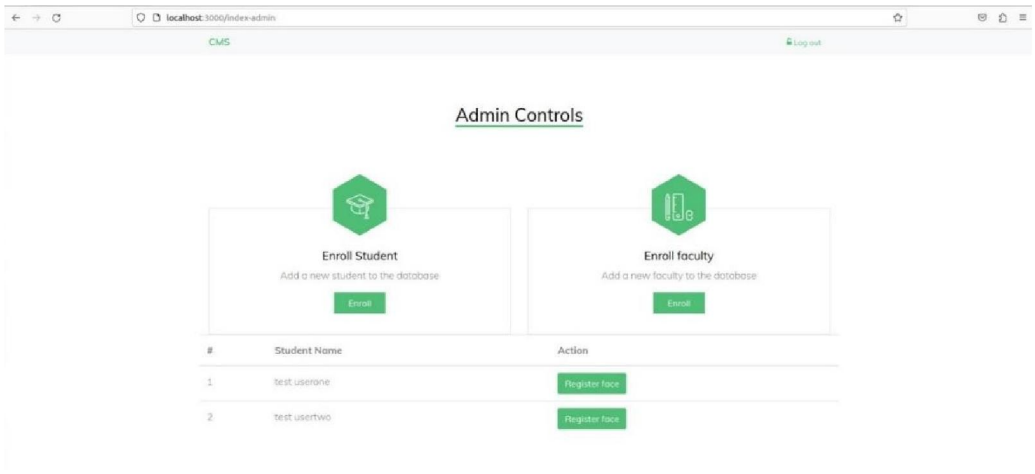

Fig. 2: Actions Performed by Admin

FACULTY

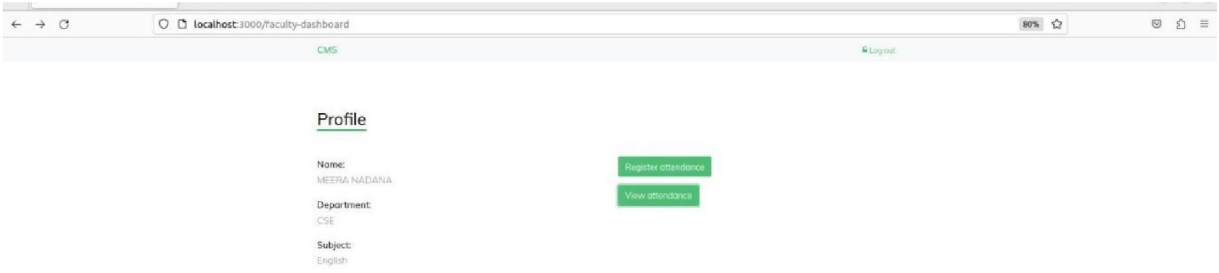

Fig. 3: Faculty Profile Page

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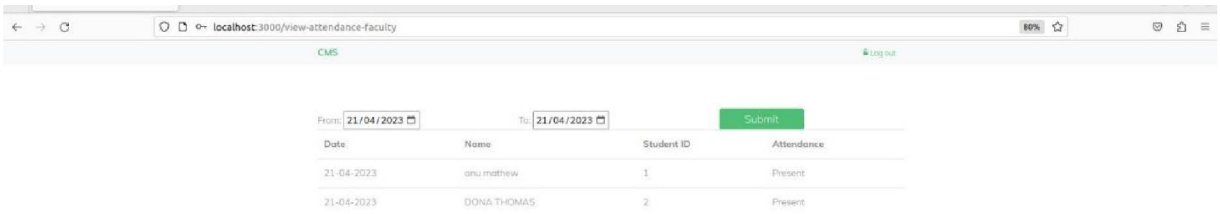

Fig. 4: Attendance View by Faculty

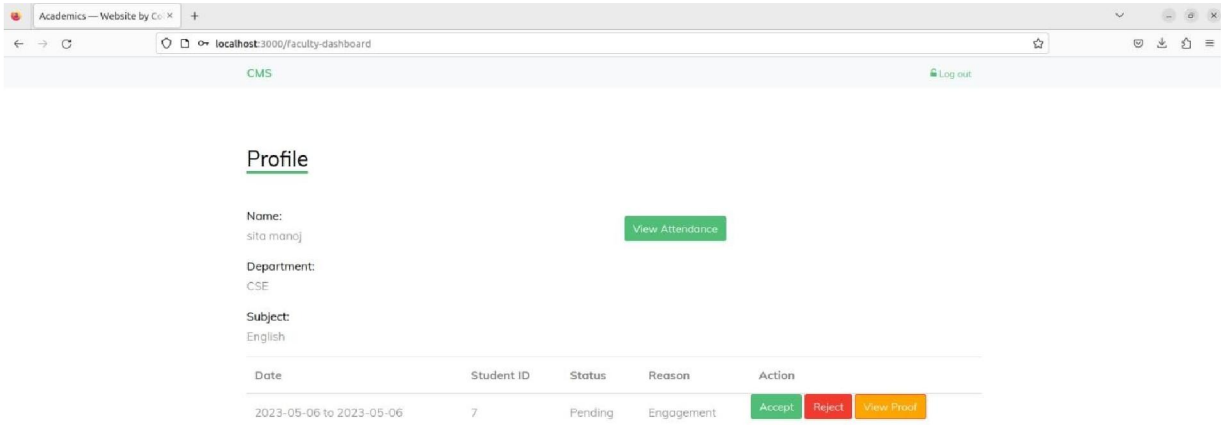

Fig. 5: Request for approval of Duty Leave

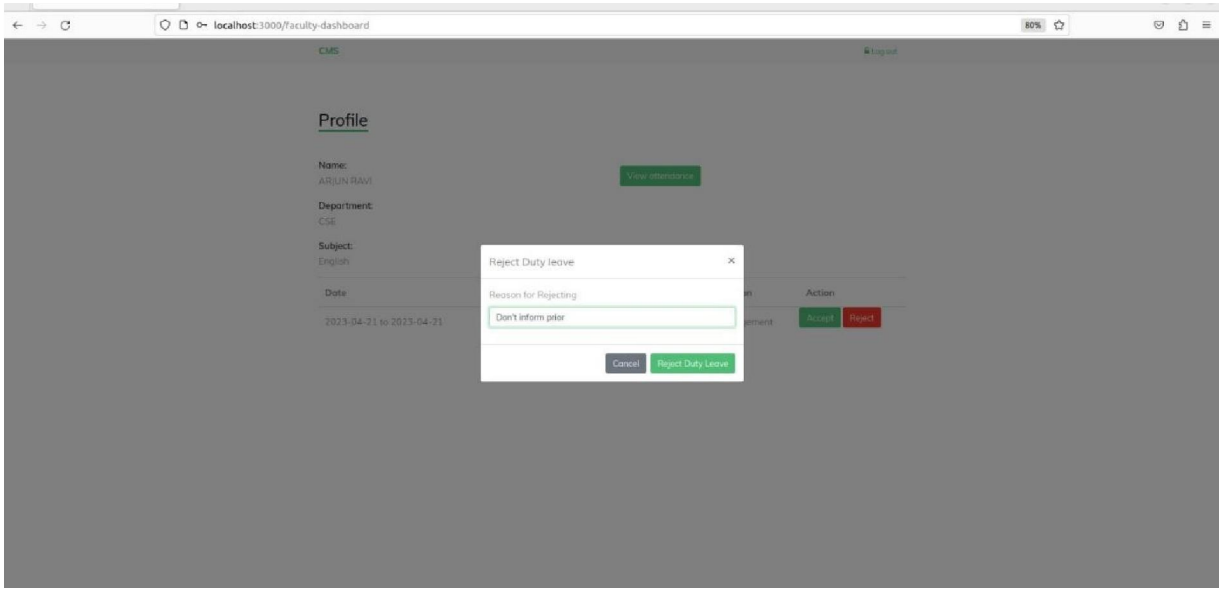

Fig. 6: Rejection of Duty Leave

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STUDENT

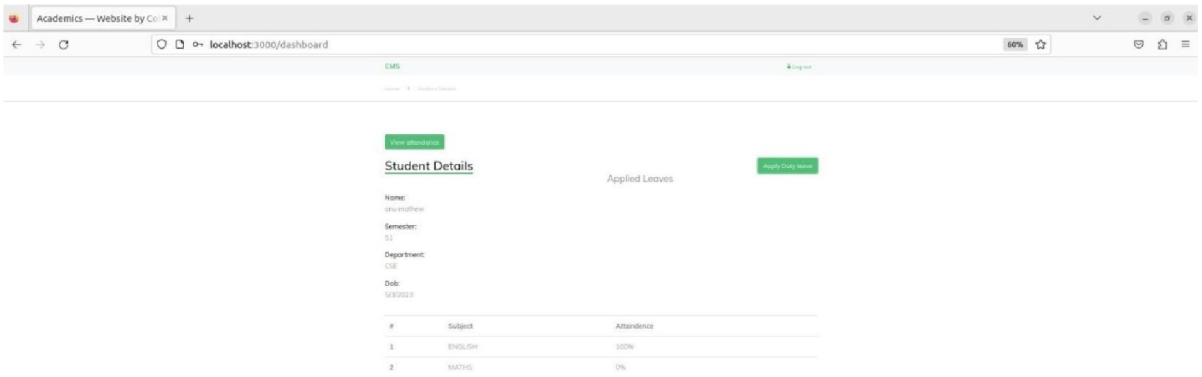

Fig. 7: Student Profile Page

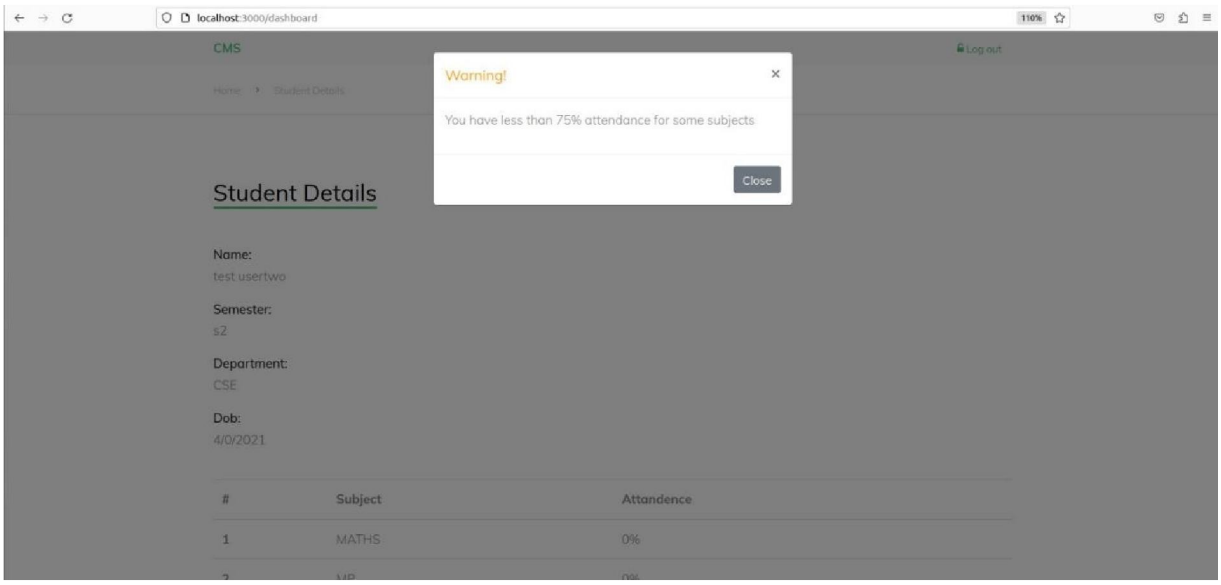

Fig. 8: Pop Up Notification

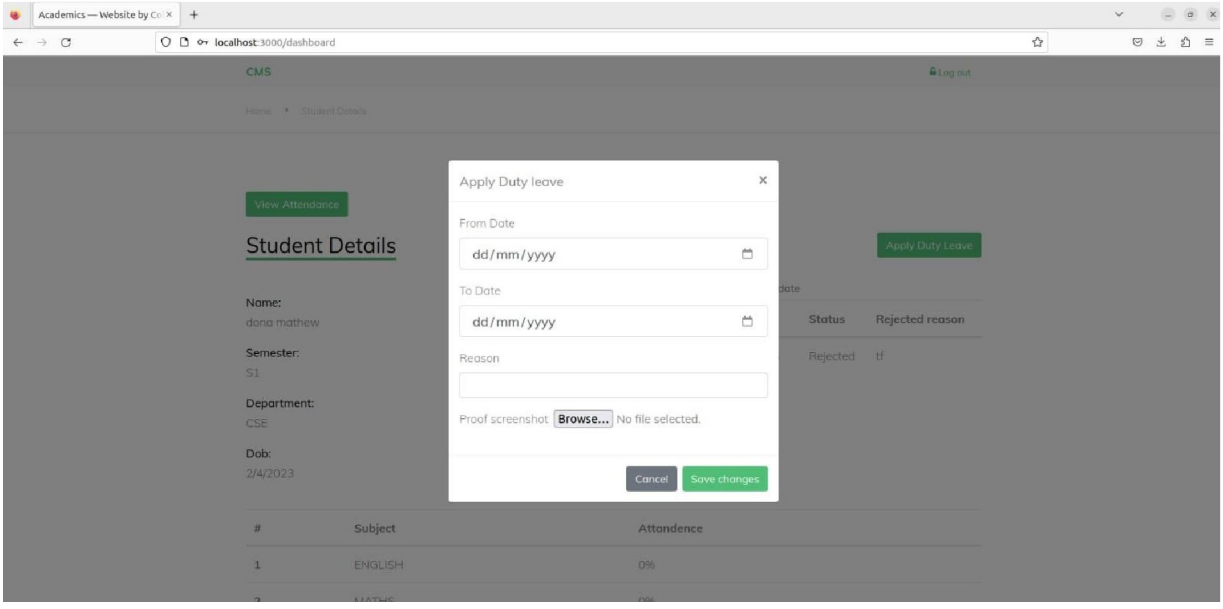

Fig. 9: Duty Leave Request

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PARENT

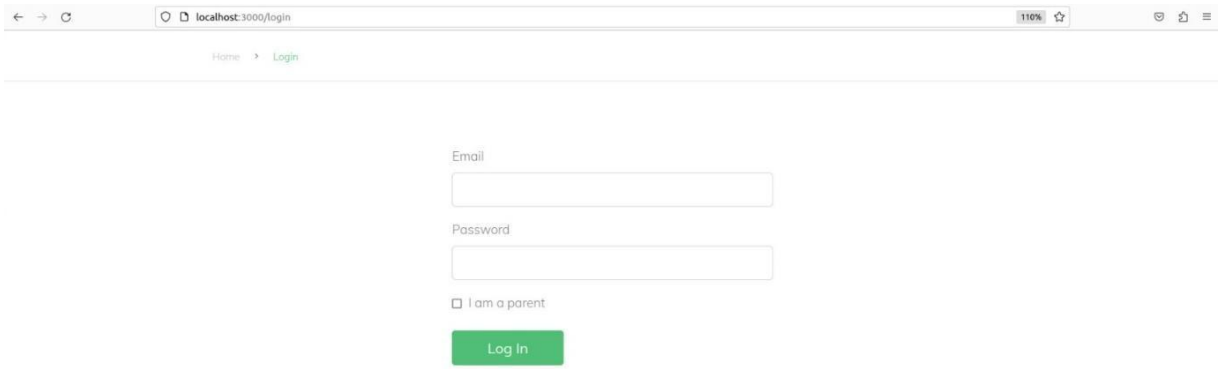

Fig. 10: Parent Login Page

VI. FUTURE SCOPE

The Face Recognition System are used in variety of applications and has tremendous scope in India. The system can be effectively used in ATM's, passport and visa verification, driving license verification, in defence, competitive and other exams, in both governments and private sectors. The future of facial recognition technology is bright. Security and surveillances are the major segments which will be deeply influenced. Other areas that are now welcoming it with open arms are private industries, public buildings, and schools. It is estimated that it will also be adopted by retailers and banking systems in coming years to keep fraud in debit/credit card purchases and payment especially the ones that are online. This technology would fill in the loopholes of largely prevalent inadequate password system. In the long run, robots using facial recognition technology may also come to foray. They can be helpful in completing the tasks that are impractical or difficult for human beings to complete.

VII. CONCLUSION

The system is a Web based application in the development of a Facial Recognition. The main members present in the system are Admin, Faculty, Student and Parent. Through the system, the students can submit the duty leave and the users can also view the attendance details of the student. When the duty leave request is get approved, then attendance for that particular individual is get updated in the system.

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