

Tridaily Attendance Management System Using Facial Recognition

¹Kishen V, ²Manikanta O, ³Nimrita Koul, ⁴Lakshmi Narayana S

^{1,2,3,4}Department of Computing and Information Technology, RevaUniversity, Bengaluru, India

¹kishengetsmail@gmail.com, ²omani97439@gmail.com, ³nimritakoul@reva.edu.in,

⁴lakshminarayana76767@gmail.com

Article Info

Volume 83

Page Number: 4586-4588

Publication Issue:

May-June 2020

Abstract

Attendance is a process by which students or employees who are a part of an organization are identified and their presence is kept track of, for administrative purposes. The existing system employs the usage of pen and paper which is tedious and mundane in nature and requires ample time to identify students or workers to mark them, either present or absent after which, the same needs to be updated either online or offline to maintain records. The designed system cuts down the entire process to an almost non-existent process, wherein the attendance of a student or employee is marked as and when the facial features of the employee is detected and recognized. Soon after the facial features are recognized, the required updates are made on a centralized database, which can be accessed and managed locally within the organizational perimeter. Implementing such a system will not only save time, but make it almost impossible to manipulate.

Article History

Article Received: 19 November 2019

Revised: 27 January 2020

Accepted: 24 February 2020

Publication: 12 May 2020

Keywords: Attendance Management Systems, dlib, Face Recognition, OpenCV

1. Introduction

The Tridaily Attendance Management System is designed to automatically mark attendance for those students whose facial features matches with those which have been recorded by the system on a one-to-one basis. Traditional attendance systems are known to be time consuming and trivial as every individual's name needs to be called out and the professor/teacher needs to visually verify the presence of a pupil in order to award the attendance. The existing method of granting attendance is not only time consuming, but is also tedious when it has to be done on an hourly basis, five days a week. This system employs the usage of computer vision on a live video feed which will be processed by ascript that triggers a query whenever a student is recognized. A user friendly GUI will also improve the usage of the project's features. This system ensures that a student is marked present soon after the facial features match with that of the dataset, thereby saving time for both the student and the teacher. Additionally, this system is also fool proof as a student needs to be physically present in order to obtain attendance for a particular class.

Thus, this system is the need of the hour to automate the trivial task of marking attendance by pen and paper, which is later uploaded to a shared database. This grants

more time to both the students and teachers to extend the lecture by a factor of 200 minutes per week.

Rest of this paper is organized as follows – Section II contains brief literature survey, Section III explains the proposed system, Section IV discusses about methodology, Section V discusses results, Section VI concludes the paper followed by references.

2. Literature Survey

The traditional system involves the usage of pen and paper and requires the professor, teacher or the supervisor to call out names of students or workers, to verify their presence or absence in the class or the factory workshop. Several other approaches such as usage of Bluetooth, fingerprint sensors, NFC enabled technologies, Iris Scanning, etc. have also been experimented, out of which facial recognition systems have observed to be efficient and easier to implement. The designed system will automate the process of identifying persons and grant them attendance automatically, which is updated to an online database. Authors in [1] have employed the usage of a cloud-based open-source facial recognition infrastructure called FACECUBE. Authors in [2] have discussed the usage of facial-recognition systems to identify persons using MATLAB 2013a simulation tool to develop a

Neural Network. Authors in [3] discuss using a facial recognition framework using Eigen (C++ Library) to detect and identify faces. Authors in [4] implemented a facial recognition system, which involves the detection of faces using the Viola and Jones algorithm and recognition using Cross-Validation technique. Authors in [5] discuss identifying faces in a frame using Principal Component Analysis (PCA) in MATLAB.

3. Proposed System

The system will consist of a video camera that provides the system with a live video feed, which will be processed to recognize students. The system will be based on an open-source computer vision platform which will enable the system to detect and identify faces of students of a particular class or a course. The students who have been identified by the system will receive the attendance for that particular hour where the updates to be made (such as time of arrival, delayed by, image of the student captured by the system) are pushed to a database. The database will be accessible to privileged users who have the authority to modify the attendance in case of discrepancies. The video feed will be processed by OpenCV, and once when the student is identified through the facial-recognition system, details relevant to granting of attendance will be updated in the database using PyMySQL. A web interface has been designed using CSS and HTML for the portal which can be accessed by the students and teachers to verify their attendance.

4. Methodology

The project was developed with an intention to simplify and reduce the time taken by the teachers to mark attendance before commencing their lecture. The images of students are collected at the time of course registration along with other details such as Student Registration Number, Name, Course and Section. The data which is obtained is now stored on the database according to different courses and sections, wherein the students of a particular course have an independent table. The images of students are locally stored on the computer which performs the facial detection and recognition. The facial encodings obtained from the images provided during registration is a 128-dimensional vector which stores the encoded facial characteristics, is unique to every person. The obtained encodings are now compared with the encodings generated during the runtime of the program from the live video feed, to determine the identity of a person by calculating the Euclidean distance between them. If the Euclidean distance is well within the tolerance limits set by the administrator, the system identifies the person in the video feed with which the distance was minimum. The identified individuals then, have their attendance updated on the database with the details reflecting on the web portal, which can be accessed by both, students and teachers to cross-check the attendance for the session and modify the same, if required.

5. Results and Discussion

Upon completion of the project, it was observed that the system had a very high accuracy and was able to identify various students, whose facial features had been used to train the system. The system also had provisions to recognize up to 3 faces in a frame of the video, and the corresponding students had been given attendance for the session. The system enabled itself at 3 different times during the day namely, morning, noon and evening, to ensure that the pupil had attended all the classes, before he can receive the attendance for the day. Therefore, it is necessary for the pupil to be present in class throughout the day, in order to be marked present for the day. Additionally, the updated values on the database were displayed on the web portal for the students to verify post class hours. The pictures below show the output observed.



Figure 1: Detection and recognition of facial features and displaying the ID of the face identified.

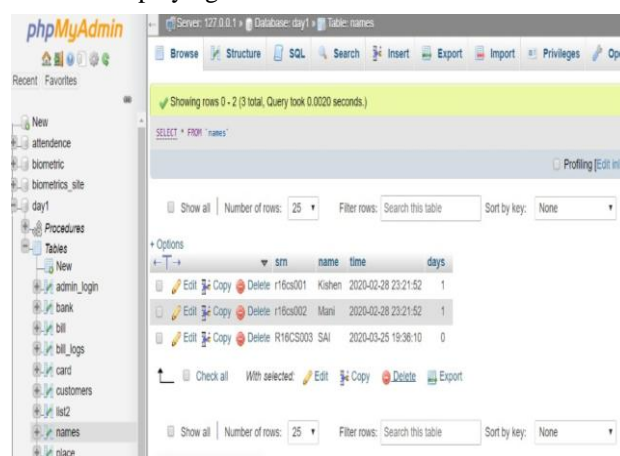


Figure 2: Updates made in the database once when the facial features are recognized.

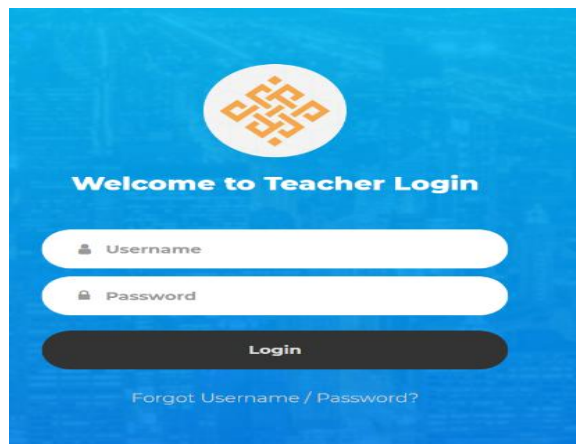


Figure3: Login page for teachers to access the database

Today Absent Details

SRN	NAME	DATE AND TIME	DAYS PRESENT
r16cs001	Kishen	2020-03-28 11:09:34	13
r16cs002	Mani	2020-03-28 11:09:34	9
R16CS003	SAI	2020-03-28 11:09:34	4
R16cs004	Samarth	2020-03-28 11:09:34	3

Figure4: Page displaying the list of students who were absent

6. Conclusion

By developing the project, we will be able to automate the task of updating attendance which usually consumes around 5 minutes for a class of 50 students. It also reduces the chance of human-errors, where either attendance is granted to the student who is absent for class and vice-versa. The developed system will also be fool-proof which ensures that only those who are physically present are marked present. It also saves paper and time and also provides real-time monitoring that enables the tracking of the exact time at which student enters the class. Thus, the developed project will be a boon in its own way for both students and teachers.

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