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# Mechanizing Student's Attendance during Online Examination via Face Recognition

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**ABSTRACT:** Today's pandemic situation has transformed the way of educating a student. Education is undertaken remotely through online platforms. In addition to the way the online course contents and online teaching, it has also changed the way of assessments. In online education, monitoring the attendance of the students is very important as the presence of students is part of a good assessment for teaching and learning. Educational institutions have adopted online examination portals for the Assessments of the students. These portals make use of face recognition techniques to monitor the activities of the students and identify the malpractice done by them. This is done by capturing the students' activities through a web camera and analyzing their gestures and postures. Image processing algorithms are widely used in the literature to perform face recognition. There are issues such as variations in human facial appearance like varying lighting condition, noise in face images, scale, pose etc. that blocks the progress to reach human level accuracy. The aim of this study is to increase the accuracy of the existing face recognition systems by making use of SVM and Eigen face algorithms. An approach similar to Eigen face is used for extracting facial features through facial vectors and the datasets are trained using Support Vector Machine (SVM) algorithm to perform face classification and detection.

## I. INTRODUCTION

Today's pandemic situation has changed the way of education to students. Education system had completely undertaken by online platforms. There are many platforms that provide services to schools, colleges and other educational institutions. In addition to the online teaching, examination also has gone online. In this online education system, it is important to monitor the student's presence i.e., attendance of the students, which plays a vital role in making the system. Even though educational institutions have adapted to online mode which is done through an online portal, it is very challenging for staffs in taking attendance for a student. With the integrated webcam in online portals, we can monitor the activities of students and malpractices done by them. But the attendance of the students is quite difficult and it is done manually by staffs by just seeing who are all in the streaming video. This can be bridled by face detection and recognition techniques using KNN algorithm. With this integration we can extract a facial feature vector which is otherwise known as embeddings and train it using Python Face Recognition Library, then identify the faces of the students before entering into the examination dashboard. If it is matched the attendance system auto updates the presence of the particular student and we can also find the attendance percentage of the students, which is useful in analysing the willing percentage of the students to write the exam online.

## II. LITERATURE SURVEY

A face recognition system using Eigen face method was proposed by Dhavalsinh [7] to monitor the attendance of the students, where the face acts as the main index. Eigen face is a set of eigenvectors used in face recognition and detection. It is used to determine the variation among multiple faces by performing a statistical analysis on the facial images. Sirovich and Kirby designed the Eigen faces approach to do facial recognition and the same was used by Matthew Turk and Alex Pentland for face classification. Kranthikiran and Pulicherla [8] made use of Eigen faces and Principal Component Analysis (PCA) to perform face detection for campus surveillance.

Continuous face biometric recognition has been used by Fayyumi and Zarrad [9] in developing a prototype for conducting online examinations. The prototype has been evaluated by obtaining feedbacks from different experts through a survey using a five-point Likert scale. The proposed system contains a question bank to assist the instructors in generating different tests randomly. Kamencay et al. [10] suggested a face recognition system using Convolutional Neural Network (CNN). The authors used OLR dataset comprising 400 diverse entities (40 categories/10 images for

every category) to carry out the experiments and validate their results. The detection accuracy of the suggested method has been compared with the three popular image recognition approaches like PCA, Local Binary Patterns Histograms (LBPH) and KNN. In comparison with these methods, the proposed CNN-based method performs better by achieving an identification accuracy of about 98.3%.

Traoré et al. [11] used a multimodal biometric framework to authenticate the participants in online examinations. The framework consists of three modalities such as mouse dynamics, keystroke dynamics, and face biometrics to check the authenticity. This framework has been included as a module in Exam Shield which is an online exam monitoring tool. Continuous face biometric recognition has been used by Fayyoumi and Zarrad in developing a prototype for conducting online examinations. The prototype has been evaluated by obtaining feedbacks from different experts through a survey using a fivepoint Likert scale. The proposed system contains a question bank to assist the instructors in generating different tests randomly.

Zhu et al. [12] addressed various challenges in face detection systems by developing a novel approach namely Contextual Multi-Scale Region-based Convolution Neural Network (CMS-RCNN) which consists of two components: 1) region proposal component and ) the region-of-interest (RoI) detection component. The proposed system deals with tiny face regions by grouping multi-scale information in both the components and also allows explicit body contextual reasoning.

Zhenguo Yuan [13] addresses the facial occlusion and improved the detection accuracy by developing a visual attention guidance model that guides in highlighting the visible area in an occluded face. This model avoids setting the additional parameters by using an activation map that predicts the location and scale of the face

The above methods are the ones that are currently available for face recognition. But there is a need for a faster and reliable method that could be used for monitoring the students during their examinations. In this project, an approach similar to Eigen face is used for extracting facial features through facial vectors and the datasets are trained using an Support Vector Machine (SVM) model which is one of the popular machine learning algorithms.

This ensures that the face recognition can be faster and can be easily used.

### III. EXISTING SYSTEM

In our education system, exam plays vital role in accessing and evaluating the student's knowledge. These exams have several strict set of rules to be followed by the students in order to write their exams and these rules ensure that the student write their exams in proper way without malpracticing. Now as it's a pandemic period this system is completely made online and the monitoring is done via webcam during the classes and exams. The educational institutions conduct exams for large number of students and it is difficult to monitor each one manually while some students take this as an advantage and started to impersonate someone like themselves during exams and scores better than the one who are true. To prevent this, we are going to integrate a face recognition technique and machine learning algorithm in proposed system.

### IV. PROPOSED SYSTEM

In our prototype we implement Python Face Recognition Module to train the Face Images. We use KNN algorithm to analyze the nodes in face image then marks the patterns in various images which is taken in different angles. These images get trained as models in python server. We develop a web application as our ground work to mark student's attendance during Online Exams. We develop with AJAX Api calls java-script functions to get our response and request more responsive. The status of the application and all details of student will be stored and retrieved from MySQL Database Server which is maintained periodically. We implement JDBC connection in java Servlet to access our database. All the requests are sent to the Backend Business Logics which is written in Java Servlets using J2EE technology.

#### MODULES

- Admin Sign in
- Student Sign in
- Attendance Update
- Exam Attendance Audit

**MODULE EXPLANATION:**

**Admin Sign-In:**

Admin or a Teacher (as Admin) can only sign in to the admin page, where they can add a new student to their university with student's basic details and their recent photo which is sent to the Python Coded Machine Learning Algorithm for future face recognition in attendance system. Also, admin can put on college events, seminars etc. The new students added are annexed to the DB maintained by the administrator.

**Student Sign-In:**

Students who are all added on by the admin can only sign in via Student Signing page. The students have to use their Student-Id and Password which is provided by admin while registration, to sign in their online class portal. In this online portal they can avail online class as well as online exam. The students need to plump for what they need.

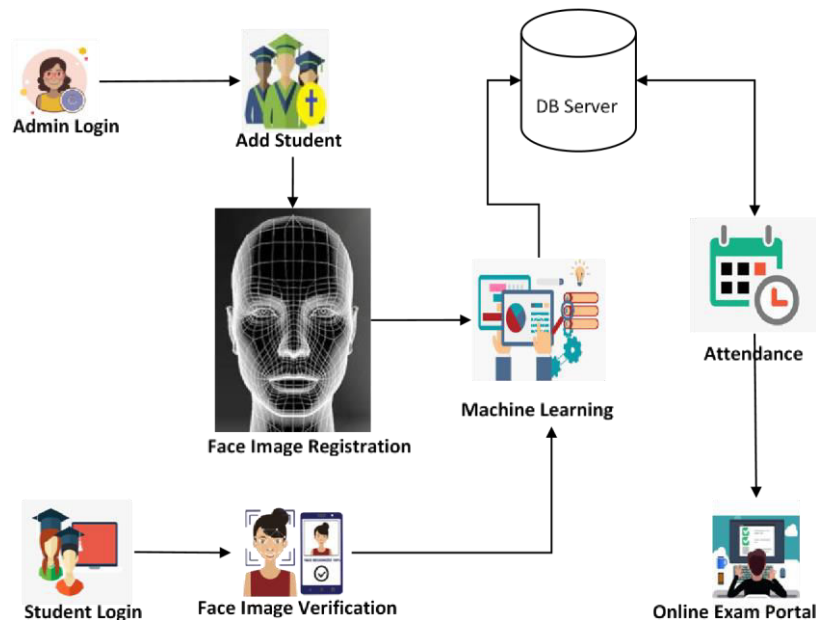
**Attendance Update:**

After students picked up their choice, they are directed to the face verification page where their faces get captured by the live camera and compared with the trained *KNN Stand* their attendance is casted up. After successful verification the students are allowed to enter their class or exam as per their choice. If the student's pick is online exam, they have to complete the test within the timer runs out. After their allocated session is done, once again they are diverted to the face verification page to add a final touch to end up the attendance process.

**Exam Attendance Audit:**

After the exam gets wind up, their marks are updated and with the attendance report an analysis of student's willingness to attend exam online will be noted down and compared.

**V. ARCHITECTURE DIAGRAM**



**VI. CONCLUSION**

A machine learning based face detection and recognition system using SVM model is proposed to detect the faces of students for monitoring their activities during online examinations. The proposed system aids in detecting the faces in a faster manner by obtaining feature vectors from the input images. Several algorithms such as LBPH, Fisher faces, SIFT and SURF can also be applied along with this method to build more efficient recognition models that can detect faces in varying illuminations and light intensities. Still better optimal values can also be obtained by applying different algorithms. Higher accuracy can be obtained using convolutional neural networks.

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