

AUTOMATED ATTENDANCE SYSTEM USING FACE RECOGNITION

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Abstract—

In the era of modern technologies emerging at rapid pace there is no reason why a crucial event in educational sector such as attendance should be done in the old boring traditional way. Attendance monitoring system will save a lot of time and energy for the both parties students as well as the class teachers. Attendance will be monitored by the face recognition algorithm by recognizing only the face of the students from the rest of the objects and then marking them as present. The system will be pre feed with the images of all the students and with the help of this pre feed data the algorithm will detect them who are present and match the features with the already saved images of them present in the database.

Keywords- face recognition, PCA

I. Introduction:

The goal of the facial recognition-based attendance monitoring system is to simplify the labor-intensive and time-consuming attendance procedure. It is a practical and simple method for both students and teachers. The technology will take pictures of the pupils and record their attendance in the log using a facial recognition algorithm. In this manner, the teacher of the class will have their attendance recorded without having to engage in time-consuming traditional attendance recording. One of the common security tasks today is the identification procedure to establish whether a person is present in a space like a room or a building. . Every person entering a room or building must first go through a number of verification procedures; this information will then be utilised to monitor every action in the room for security purposes. There are still several authentication procedures used to confirm a person's presence in a space. The procedure varies from entering a name and signature in the attendance list, using an identity card, or using biometric techniques of authentication like a face scanner or fingerprint reader.

In all educational institutions, keeping track of students' daily attendance is a crucial responsibility. In the conventional attendance system, it takes a lot of time to check each person individually to see if they are absent. Another practise is for everyone to sign their name on an attendance sheet, which is inappropriate because anyone can easily mimic someone else's signature . All the complexity can be lowered by using an automatic attendance system. We have created a biometric artificial intelligence (AI) based system in this study that will be useful in educational and government settings where frequent attendance is crucial. The suggested automatic class attendance system aims to identify each student's face from a video stream and then identify the faces by comparing the identified faces to the ones that are already recorded in the system. Additionally, this technology has the capacity to instantly and automatically identify several people on the screen from the video stream.

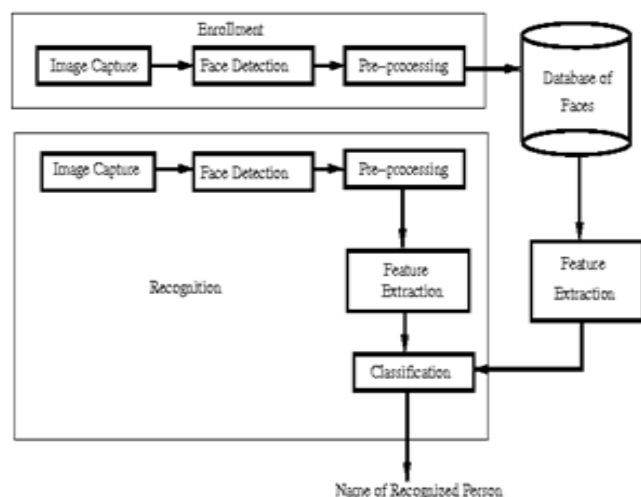
1. Objective:

A face recognition attendance system uses facial detection to automatically identify, verify, and record attendance for a person. Both small and large enterprises are becoming interested in face recognition attendance systems. With so many benefits for both companies and employees, it's no surprise that these systems are becoming more common in workplaces. For both the teacher and the student in an educational setting, attendance is extremely crucial. Therefore, keeping a record of attendance is crucial. When we consider the conventional method of recording attendance in a classroom, the issue appears. Calling a student's name or roll number for attendance causes problems with both time and energy use. So, the automatic attendance system can address all of the aforementioned issues. There are a few automated systems for keeping track of attendance that are now being employed by several institutions. RFID technology and biometrics are two examples of such systems. Despite being automatic and a step up from the conventional method, it falls short of the deadline. For giving attendance, the student must stand in queue, which takes time. With no disruption to the regular teaching process, this project provides an involuntary attendance marking system. The technique can also be used in situations like test sessions or other instructional activities when attendance is crucial. This technique does away with traditional methods of student identification like calling out names or checking identity cards, which can not only disrupt ongoing lessons but also cause anxiety in students during exam periods. In order to be identified, the pupils must also register in the database. The user-friendly interface allows for immediate enrollment.

2. Literature review:

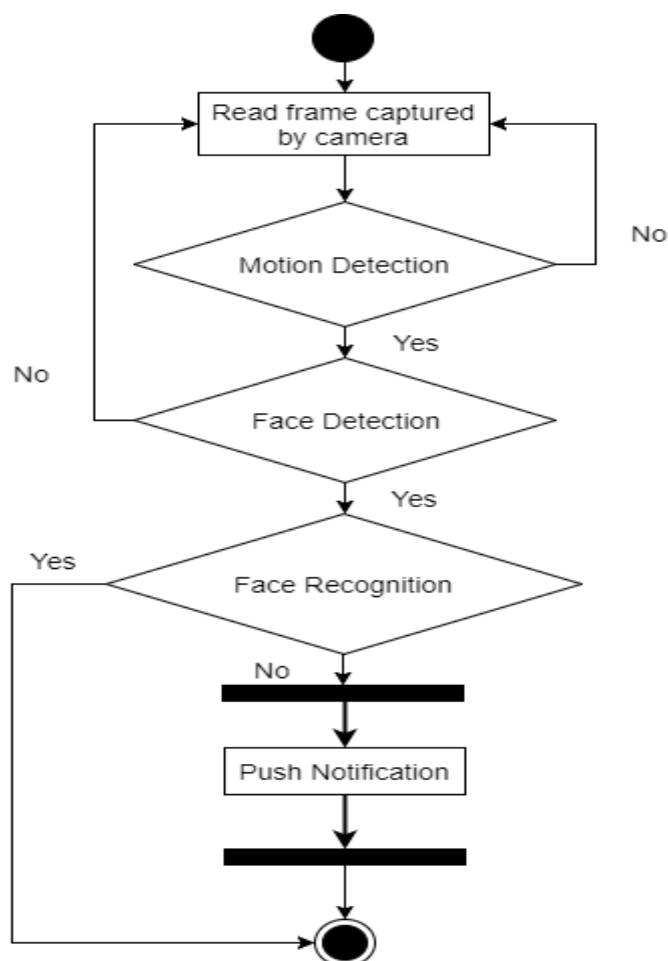
In this study, a machine learning strategy has been used to implement the concepts of two technologies, namely the student attendance and feedback systems. This programme automatically assesses student performance and keeps track of their attendance and evaluations of topics like science, english, etc. As a result, recognising a face enables the availability of the student's attendance. Following identification, information regarding the student's attendance and grades is obtained as feedback.

Implementation

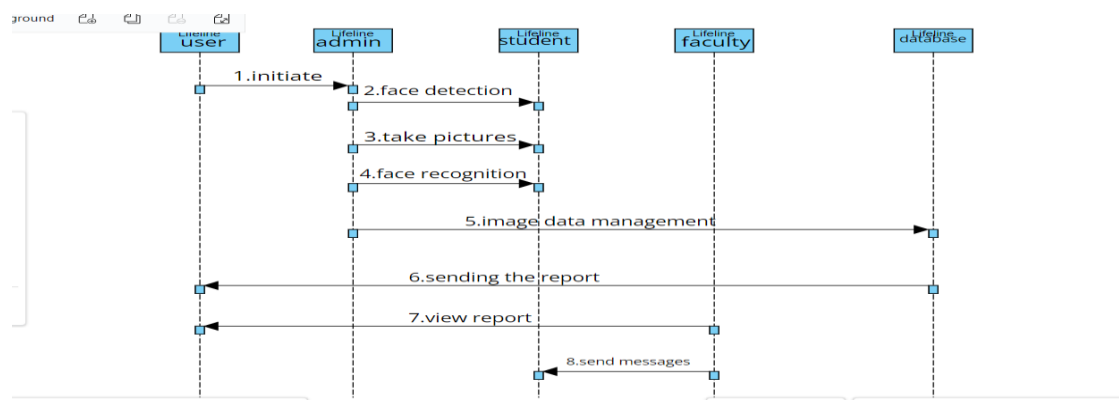


A. Block diagram

Flow chart



Sequence diagram



3. Methodology

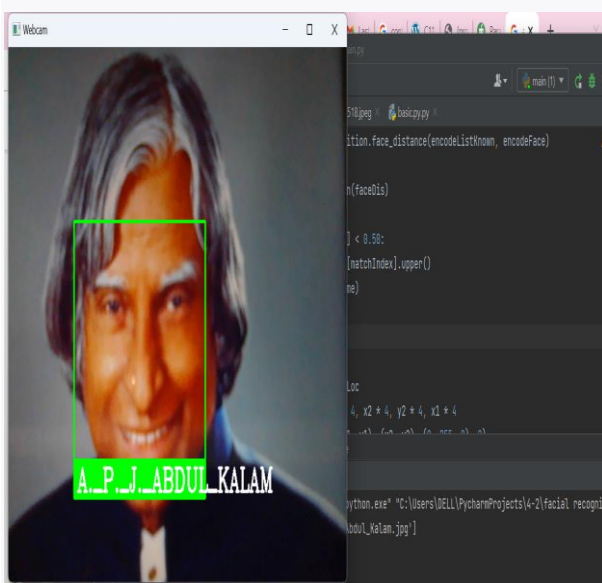
CVZone is a computer vision library developed by CodeVisionAI specifically for Python. It offers a range of functionalities and modules for computer vision tasks. Some of the key features provided by CVZone include:

1. **Face Detection and Recognition:** CVZone provides pre-trained models and APIs for face detection and recognition tasks, allowing you to detect faces in images or video streams and perform face recognition based on trained models.
 2. **Object Detection:** The library includes modules for object detection, enabling you to detect and classify objects within images or videos. It supports popular object detection models such as YOLO and SSD.
 3. **Pose Estimation:** CVZone provides pose estimation capabilities, allowing you to estimate the poses and keypoints of humans or objects in images or video frames. This can be useful for applications such as motion tracking or analyzing human movements.
 4. **Image Processing:** The library includes various image processing functionalities, such as image filtering, resizing, cropping, and augmentation. It provides convenient APIs to perform these operations on images.
 5. **Gesture Recognition:** CVZone offers gesture recognition features, allowing you to recognize and track hand gestures in real-time. This can be useful for applications involving gesture-based interactions or control.
 6. **Virtual Paint:** CVZone includes a virtual paint module that enables you to create a virtual drawing canvas where you can paint or draw using your hand or any object. It tracks the movement of the hand or object and renders the drawing accordingly.
- CVZone aims to simplify computer vision tasks by providing pre-trained models and a user-friendly API. It can be used for a wide range of applications, including image processing, object detection, face recognition, pose estimation, and interactive experiences involving gestures or virtual painting.

4. Simulation and result

In a simulation and result the data set from user has been taken. Simulation has been done on pycharm. From these results we can see that although most of the researchers are using different algorithms such as CNN, HAAR cascade algorithm, LBPH and PCA. The algorithms that we used are more accurate, saves a lot of money i.e. it is cost efficient and faster than the algorithms that the previous researchers used. Moreover, the maximum accuracy obtained by PCA and Logistic Regression are equal to 88.5% which is greater or almost equal to accuracies obtained from previous researches.

5. Result:





1. *Advantages and applications*

A. *ADVANTAGES*

- It is trouble-free to use.
- It is a relatively fast approach to enter attendance.
- Is highly reliable, approximate result from user .
- Best user Interface .
- Can obtain accuracy upto 85 percent.

6. *Conclusion*

The Automated Attendance System, which was created using machine learning, achieves the goals for which it was created. All bugs have been eradicated and the system has attained equilibrium. The system is run with excellent efficiency. The issue is resolved by the computer. The problem was meant to be solved as a requirement statement.

8. *Future scope*

The system can currently do CRUD operations, which stand for create, read, update, and delete. However, in the near future, systems associated to databases will be able to operate in all manners of SQL Operations. It is feasible to expand the functionality of a student information management system by adding more tools to this solution. Tools can be created to retain control over and monitor institute data, offer information about institute events, and provide other vital information so that all stakeholders are aware of the work being done by the institute.

Despite attempts to use RPA as the backend technology, there are still a few areas that need more investigation, particularly those involving the integration of unstructured data and offering essential research concepts for developing ChatBoxs.

One example is the use of RPA technology along with AL and ML technologies for the integration and analysis of large amounts of data. This calls for effective searches, calculations, and upkeep of documents and transaction.

9. References

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