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Attendance System Utilizing Face Recognition Technology

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Abstract- Automatic facial recognition (AFR) technologies have undergone significant advancements in response to the evolving world. Smart Attendance, utilizing Real-Time Face Recognition, represents a practical solution integrated into the daily operations of managing student attendance systems. The face recognition-based attendance system entails the process of identifying students' faces to mark attendance, employing facial biometrics derived from high-definition monitor videos and other information technologies.

In this face recognition project, the objective is to enable a computer system to swiftly and accurately detect and recognize human faces within images or videos captured through surveillance cameras. While various algorithms and techniques have been devised to enhance face recognition performance, the focal concept implemented here is Deep Learning. Deep Learning facilitates the conversion of video frames into images, facilitating the recognition of students' faces for attendance purposes, thus automating the attendance database management seamlessly.

Index Terms- Face recognition, Face detection, Convolution Neural Network (CNN).

I. Introduction

The technology aims in imparting a tremendous knowledge oriented technical innovations these days. Deep Learning is one among the interesting domain that enables the machine to train itself by providing some datasets as input and provides an appropriate output during testing by applying different learning algorithms. Nowadays Attendance is considered as an important factor for both the student as well as the teacher of an educational organization. With the advancement of the deep learning technology the machine automatically detects the attendance performance of the students and maintains a record of those collected data.

In general, the attendance system of the student can be maintained in two different forms namely,

- Manual Attendance System (MAS)
- Automated Attendance System (AAS).

Manual Student Attendance Management system is a process where a teacher concerned with the particular subject need to call the students name and mark the attendance manually. Manual attendance may be considered as a time-consuming process or sometimes it happens for the teacher to miss someone or students may answer multiple times on the absence of their friends.

So, the problem arises when we think about the traditional process of taking attendance in the classroom. To solve all these issues we go with Automatic Attendance System(AAS).Automated Attendance System (AAS) is a process to automatically estimate the presence or the absence of the student in the classroom by using face recognition technology. It is also possible to recognize whether the student is sleeping or awake during the lecture and it can also be implemented in the exam sessions to ensure the presence of the student. The presence of the students can be determined by capturing their faces on to a high-definition monitor video streaming service, so it becomes highly reliable for the machine to understand the presence of all the students in the classroom. The two common

Human Face Recognition techniques are,

- Feature-based approach
- Brightness-based approach.

The Feature-based approach also known as local face recognition system, used in pointing the key features of the face like eyes, ears, nose, mouth, edges, etc., whereas the brightness-based approach also termed as the global face recognition system, used in recognizing all the parts of the image.

II. Existing Work or Literature Survey

1.Fingerprint Based recognition system:

In the Fingerprint based existing attendance system, a portable fingerprint device need to be configured with the students fingerprint earlier. Later either during the lecture hours or before, the student needs to record the fingerprint on the configured device to ensure their attendance for the day. The problem with this approach

is that during the lecture time it may distract the attention of the students. RFID(Radio Frequency Identification) Based recognition system:

In the RFID based existing system, the student needs to carry a Radio Frequency Identity Card with them and place the ID on the card reader to record their presence for the day. The system is capable of to connect to RS232 and record the attendance to the saved database. There are possibilities for the fraudulent access may occur. Some are students may make use of other students ID to ensure their presence when the particular student is absent or they even try to misuse it sometimes.

2. Iris Based Recognition System:

In the Iris based student attendance system, the student needs to stand in front of a camera, so that the camera will scan the Iris of the student. The scanned iris is matched with data of student stored in the database and the attendance on their presence needs be updated. This reduces the paper and pen workload of the faculty member of the institute. This also reduces the chances of proxies in the class, and helps in maintaining the student records safe. It is a wireless biometric technique that solves the problem of spurious attendance and the trouble of laying the corresponding network.

Face Based Recognition System:

The facial recognition technology can be used in recording the attendance through a high-resolution digitalcamera that detects and recognizes the faces of the students and the machine compares the recognized face with students' face images stored in the database. Once the face of the student is matched with the stored image, then the attendance is marked in attendance database for further calculation. If the captured image doesn't match with the students' face present in the database then this image is stored as a new image onto the database. In this system, there are possibilities for the camera to not to capture the image properly or it may miss some of the students from capturing.

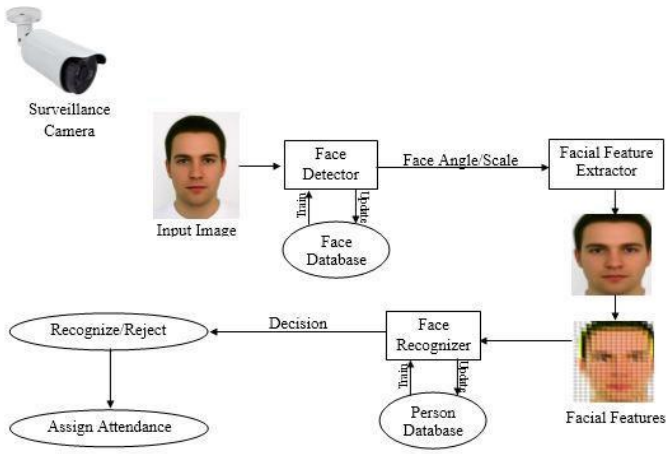
III. Proposed System

The task of the proposed system is to capture the face of each student and to store it in the database for their attendance. The face of the student needs to be captured in such a manner that all the feature of the students' face needs to be detected, even the seating and the posture of the student need to be recognized. There

is no need for the teacher to manually take attendance in the class because the system records a video and through further processing steps the face is being recognized and the attendance database is updated.

IV.Results and Discussion

The main working principle of the project is that, the video captured data is converted into image to detect and recognize it. Further the recognized image of the student is provided with attendance, else the system marks the database as ,



Capture video:

The Camera is fixed at a specific distance inside a classroom to capture videos of the frontal images of the entire students of the class Separate as frames from the video:

The captured video needs to be converted into frames per second for easier detection and recognition of the studentsface to generate the attendance database.

Face Detection:

Face Detection is the process where the image, given as an input (picture) is searched to find any face, after finding the face the image processing cleans up the facial image for easier recognition of the face.CNN algorithm can be implemented to detect the faces

Face Recognition:

After the completion of detecting and processing the face, it is compared to the faces present in the students' database to update the attendance of the students.

Post-Processing:

The post-processing mechanism involves the process of updating the names of the student into an excel sheet. The excel sheet can be maintained on a weekly basis or monthly basis to record the students' attendance. This attendance record can be sent to parents or guardians of students to report the performance of the student.

V.CONCLUSION

The objective of this project is to record students' videos, convert them into individual frames, correlate them with a database to confirm their attendance, and then register their attendance status. The Automated Classroom Attendance System aims to enhance accuracy and efficiency, ultimately achieving high-precision real-time attendance tracking to fulfill the requirement for automated classroom evaluation.

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