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Face Detection Based Attendance System

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ABSTRACT: Day to day we are connecting to the world and automating everything around us. The web of things, picture handling, and AI are developing step by step. Numerous frameworks have been totally changed because of this advance to accomplish more exact outcomes. The participation framework is a regular illustration of this change, beginning from the customary mark on a paper sheet to confront acknowledgment. This Venture proposes a technique for fostering an extensive implanted class participation framework utilizing facial acknowledgment with showing whether the essence of the individual is the student for that predetermined class or not. The framework depends on the AI calculation which is to be carried out on python language and utilizing PC/PC camera for the information picture of the students or a typical external camera can likewise be utilized which must be associated with the framework which is customized to deal with the face acknowledgment.

KEYWORDS: Artificial Intelligence, Automatic Attendance System, facial recognition.

I. INTRODUCTION

The system aims to maintain student attendance records using face recognition, a method that uses deep learning techniques to detect and recognize faces in images. The system automatically updates attendance with corresponding time and subject ID. The system uses a histogram of oriented gradient method to detect faces and computes and compares facial features. The main objective is to develop an automated student attendance system that can identify multiple faces in real time.

Attendance is crucial in institutions for student performance, and various methods are used for this, including manual attendance and automatic attendance using biometric techniques. Biometric systems involve enrolment, identification, and verification processes, which compare biometric features with previously stored templates. A face recognition approach is used for automatic attendance without students' intervention, detecting faces in images and comparing them with the database. Methods like AdaBoost, Float Boost, Neural Networks, S-AdaBoost, Support Vector Machines, and Bayes classifiers have been proposed for face detection. The most efficient method is Viola and Jones. Face recognition techniques can be categorized into appearance-based and feature-based, using statistical tools like Linear Discriminant Analysis, Principal Component Analysis, Kernel Methods, Neural Networks, and Eigen-faces.

II. RELATED WORK

Radio Frequency Identification Based Attendance System (RFID):

In RFID-based attendance system, students carry an RFID tag-type ID card, place it on a reader, and connect it to a computer using RS232. However, this system raises concerns about fraudulent access edges followed by thresholding and morphological dilation, erosion operation. Then, connected component labelling is performed to label each object separately. After that, filtering is done on the non-text region by using the selection criteria. Finally, the text inpainting criteria is applied by using exemplar based inpainting algorithm. [1-3]

Fingerprint based Attendance System:

A fingerprint-based attendance system has been developed, allowing students to mark their attendance without an instructor's intervention, but this method may distract students' attention during lectures.[1]

Iris Recognition based Attendance System:

The Daugman's algorithm is used in iris recognition-based attendance system, which records, extracts, saves, and compares images, to present an Iris-Recognition-Based Attendance System. Topographic problems, however, make transmission lines difficult. It is suggested to implement a real-time facial recognition system, however better illumination is needed.[1]

III. METHODOLOGY

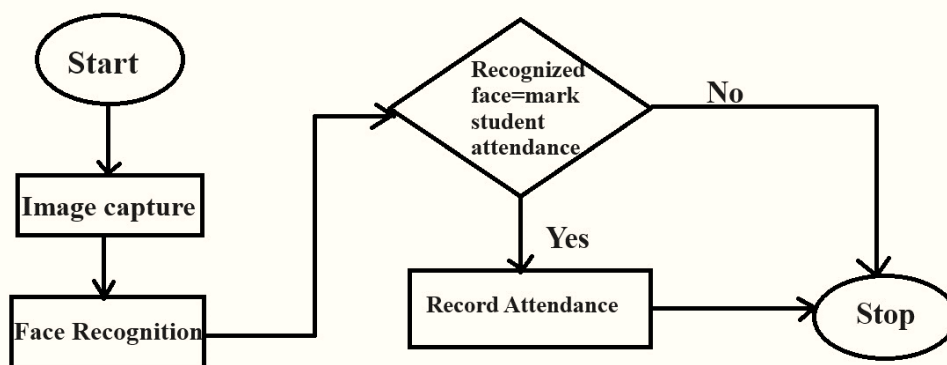
The proposed framework utilizes OpenCV library. It is an Open- Source PC Vision Library that is free for both scholarly and business use. It has C++, Python and Java points of interaction and supports Windows, Linux, MacOS, iOS and Android. It has major areas of strength for an on constant applications. The library has in excess of 2500 enhanced calculations, these calculations can be utilized to identify and perceive faces, distinguish objects, and so on.

OpenCV has a Face-Recognizer class library for face acknowledgment. This perceives and controls faces from Python or from the order line. It is an extremely basic library assembled utilizing dlib's cutting edge face acknowledgment worked with profound learning. The dlib is a cross-stage open- source programming library that is carried out on different figuring

stages. The model has an exactness of 99.38%. This gives a basic face-recognition order line instrument that allows you to do confront acknowledgment on an organizer of pictures from the order line.

The incorporated model delineating the essential ventures for data set making of the multitude of understudies signed up for the class, then, at that point, acknowledgment process for additional participation checking, after that contrasting the outcomes got and the predefined information base for exact result, if any understudy who is available in the data set however was missing in the acknowledgment cycle will be viewed as missing in that class. A succeed sheet will be made with participation record of that day.

In short, the suggested system makes use of the OpenCV library, a free and open-source computer vision library that has more than 2500 real-time optimized algorithms. It comes with a Face-Recognizer class library for face recognition that was created with dlib's deep learning technology. With a 99.38% accuracy rate, the model offers a straightforward command-line tool for image-based face identification. The process comprises building a database, recognizing, recording attendance, and comparing the outcomes with a pre-established database. Parents who are not there receive an email and an excel sheet is made for attendance information.[3]



IV. CONCLUSION

Using OpenCV techniques on a Python framework, the project emphasizes the significance of facial recognition in automation. Compared to general algorithms like Haar cascade and LBPH, the model is preferable since it is a straightforward command line program with an accuracy of 99.38%. Future work will focus on enhancing the accuracy and speed of the model.

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