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Classroom Attendance Management System Using Camera

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***Abstract*: The management of the attendance can be an extraordinary load on the instructors in the event that it is finished by hand. To determine this issue, smart and auto attendance management system is being utilized.**

In any case, validation is a remarkable issue in this system. The smart participation framework is commonly executed with the assistance of biometrics. Face acknowledgment is one of the biometric techniques to improve this framework. To make a robotized participation framework for understudies utilizes face acknowledgment strategy by utilizing Max-Margin Face Detection (MMFD). One of the significant difficulties in a study hall is to build up PC vision based classroom attendance management system. The proposed framework utilizes the lens for catching the faces of understudies and Max Margin Face Detection (MMFD) strategy for the face recognition and the model is prepared utilizing the Inception-V3 CNN method for the understudies' recognition.

***Keywords*: Facial detection, Facial recognition, Haar cascade object detection algorithm, LBPH Face recognition algorithm, Max Margin Face Detection (MMFD).**

1. Introduction

To follow the attendance of scholars is a significant worry in numerous instructive foundations. The traditional management of the attendance sheets is laborious for packed study halls. In proposed framework a strategy is utilized for the robotized student participation framework that can be utilized in packed study halls, in which the meeting pictures are taken by lens. The proposed framework dependent on countenance acknowledgment can be utilized to spare time for both educator and understudies and to stop fraud participation. This framework could be a piece of a next generation smart classrooms so as to enhance educating and learning involvement with the study hall. In countenance acknowledgment, the job is to distinguish a subject showing up in a picture as an extraordinary person.

The proposed framework utilizes the lens for catching the countenance of scholars. The advance framework utilizes Max Margin Face Detection (MMFD) strategy for the countenance recognition and the model is prepared utilizing the Inception-V3 CNN method for the scholars' recognition.

Ordinarily attendance taken in study hall is manual procedure. That is in each time of the instructors needed to call the understudies by their roll number and mark participation in the participation sheet present and missing. This procedure devours the significant class time for both the understudies and educators, may once in a while produces fraud participation, so tiring procedure for the instructors, and hard to process and keep up the participation sheets. In the proposed framework participation is done through the face acknowledgment in which face plays a fundamental factor. This strategy defeats the difficulties of customary study hall participation. So making the participation in study hall robotized produces the exact outcomes and keeps up the participation in the database.

2. Literature Survey

In [1], Participation recording of an understudy in a scholastic association assumes a fundamental job in making a decision about understudy's exhibition. As difficult work engaged with this procedure is tedious, a computerized Attendance Management System (AMS) in light of face identification and countenance acknowledgment methods is implementing in this article. The proposed framework improves the presentation of existing participation the executives' frameworks by taking out manual calling, checking and passage of participation in institutional sites. It requires enormous space and colossal preparing information.

In [2], Theoretical: This paper presents a one of a kind and efficient facial picture representation upheld neighborhood double example (LBP) surface alternatives. The face picture is part into numerous districts from that the LBP include appropriations zone unit separated related connected into an expanded element vector to be utilized as a face descriptor. The presentation of the arranged procedure is evaluated inside the face acknowledgment drawback underneath entirely unexpected difficulties. Different applications and various different expansions are referenced.

In [3], Class cooperation enlistment, a productive recommends that of schoolroom the board will encourage understudies to go to classification on schedule and ensure the nature of instructing. The lion's share schools are utilizing a move call to imagine and record whether understudies are

returning to class or not. The time required for this technique relies upon the quantity of understudies, which is an enormous exercise in futility. This paper presents another strategy that accomplishes programmed enlistment dependent on face acknowledgment by building up an android application. Furthermore, so as to adjust to the enlightenment of various homerooms, we proposed another light preprocessing calculation. The exploratory outcomes show that our framework extraordinarily improves the effectiveness of enlistment. Additionally, the framework can introduce in the study hall effectively.

In [4], In present scholastic framework, ordinary class participation of understudies assumes a significant job in execution appraisal and quality checking. That is in each time of the instructors expected to call the understudies by their move number and imprint participation in the participation sheet present and missing. This procedure expends the significant class time for both the understudies and educators. This report confers the programmed participation the board framework for comfort or information unwavering quality. The framework is created by the reconciliation of pervasive parts to make a versatile gadget for dealing with the understudies' participation utilizing face recognition technology.

3. Problem Statement

Each association has taken its own strategy for attendance marking framework. Some proceed with the customary strategy for taking participation manually while some have received the biometric procedures. The conventional technique makes it hard to check understudies individually in an enormous study hall condition. Besides, the difficult work engaged with registering the participation rate turns into a significant job. The Radio Frequency Identification (RFID) assists with recognizing an enormous number of groups utilizing radio waves. It has high proficiency and without hands get to control. Be that as it may, it is seen that it tends to be abused.

A. Existing system

In conventional study hall condition, understudy's attendance management is one of the key factors to examine the understudy's studying methodology. There were a couple of work in attendance management system to beat the strains glanced in a conventional study hall condition by utilizing finger print, RFID, iris, remote and countenance recognition based procedures. Furthermore, there were more countenance recognition based frameworks available in which they place a lens in a study hall, get the image/video, and see the understudies using face recognition methodologies.

Limitations of existing system:

- While catching the picture, the understudy should focus to identify the countenance.
- Only frontal countenance is identified.
- This framework recognizes the understudies just in the event that they are near the camera.
- Cannot distinguish a wide range of inclined (left/right/up/down).

B. Proposed system

The proposed framework take attendance without understudies being aware of the participation procedure and in this manner taking the attendance in a genuine study hall condition makes the proposed application unobtrusive. The proposed algorithm for students Attendance System comprises of five stages: i. Enrollment, ii. Catch of study hall pictures, iii. Face recognition iv. Query database and v. Matching algorithm.

Advantages of proposed system:

- Design an unobtrusive and modernized attendance management system with a more precision of face detection and recognition algorithm for any different countenance using a camera without human mediation.
- To develop support the administrators' structure this identifies understudy's details and reserve it in the file for the whole course for that certain teacher.
- Proposed framework spares important class time for both the understudies and instructors. It avoids fraud participation of understudies.
- It gives exact outcome with various catches. It identifies every single shifted face situated frontal, inclined up/right/left/down.

4. System Architecture

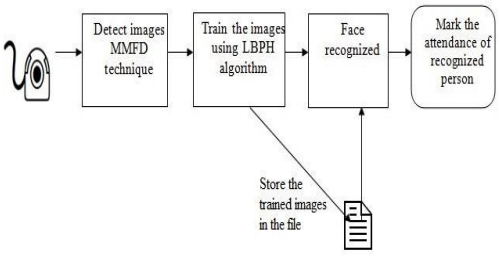

Fig. 1. System architecture

The Figure 4.1 shows the System design. Camera will catch the pictures in the study hall. Detect faces utilizing max-margin face detection technique. Train the pictures utilizing LBPH calculation. Store the prepared pictures in the document. Compare caught picture with stored picture from document. If understudies are recognized from stored record, then the participation will be set apart as present in any case set apart as missing.

5. Flowchart

The fig. 2, shows flow chart. Catch the picture and send it to the record. Detect face using max-margin face detection methodology. Recognize the perceived understudies' countenances using the Inception-V3 model. Create work-sheet that contains understudy's name, roll no, specific countenance

picture and time-stamp. Compare caught picture with stored picture from document. If all understudies are recognized, then stopped capturing the next frame regardless carry on with getting the successive frame. The process will end if all understudies are recognized or the number of captured frames exceeds more than five. If understudies are recognized from stored record, then the participation will be set apart as present in any case set apart as missing.

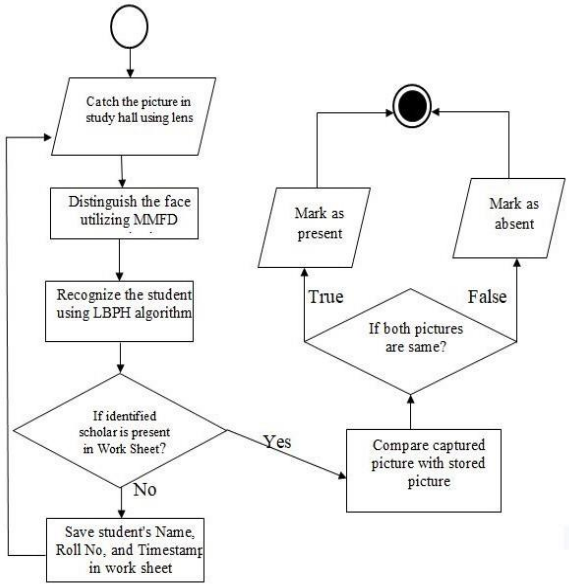

Fig. 2. Flowchart diagram

6. Algorithms

1) Viola Jones Face Detection algorithm

The algorithm has three stages:

- Haar Feature Selection
- Adaboost Training
- Cascading Classifiers

2) LBPH face recognition algorithm

A. Viola Jones Face Detection algorithm

- *Haar features:* Are used to detect the presence of the features in the given image. In a 24*24 window there are 160,000+ features.
- *Adaboost:* As stated previously there can be approximately 160,000+ features within 24*24 windows. But among all these features most of them are irrelevant. So Adaboost selects only relevant features.
- *Cascading:* An image can contain one or more faces or non-faces. So cascading concentrates on discarding non-faces quickly and spends more time on face regions.

B. LBPH face recognition algorithm

- Local Binary Patterns Histogram (LBPH) algorithm is widely used in facial recognition due to its computational simplicity and discriminative power.
- Using central pixel value as threshold, it compares a pixel to its 8 closest pixels like if the value of neighbor is greater than or equal to the central value it is set as 1 otherwise it is set as 0. Now the matrix will contain only binary values. Then convert binary value to decimal value and set it to the central value of the matrix.
- Create histogram of each region. After creation of histogram for each region all the histograms are merged to form a single histogram.
- Compare the histograms of the test image and the images already stored in the file and then we return the image with the closest histogram.

7. Results

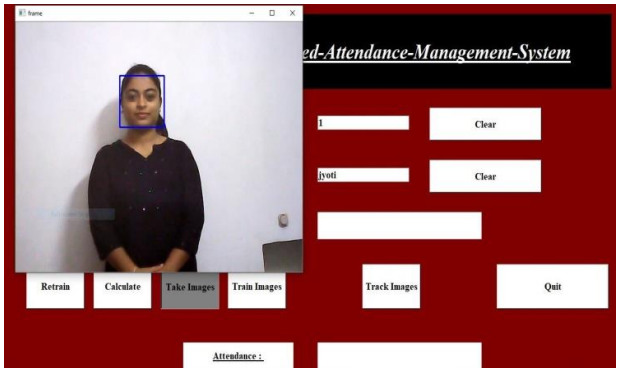

Fig. 3. Shows the captured image

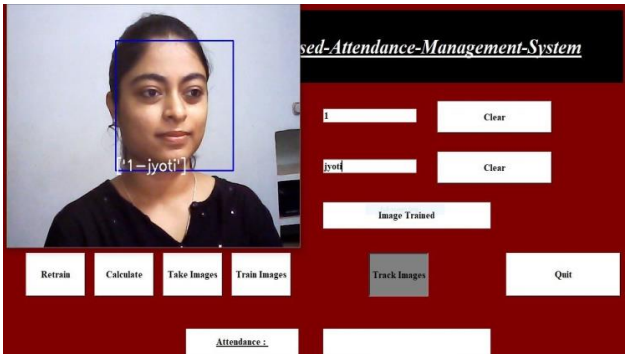

Fig. 4. Shows tracked image of tilted countenance

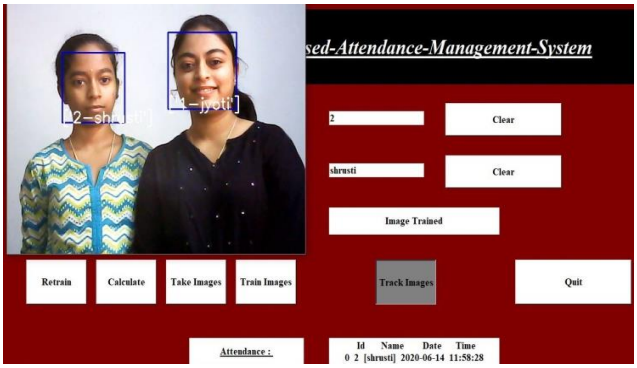

Fig. 5. Shows the tracking multiple countenances

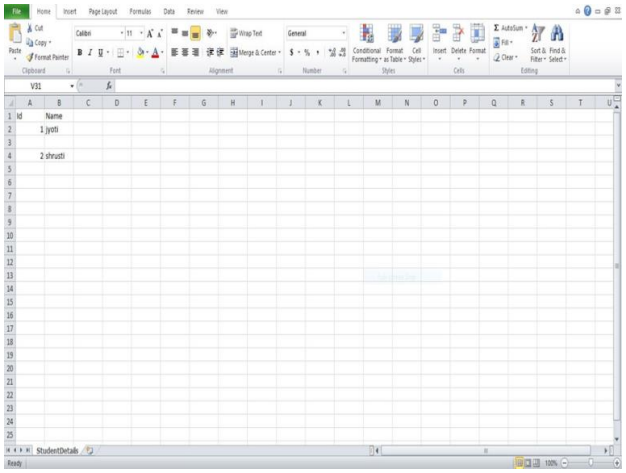

Fig. 6. Shows the details of scholar's in excel sheet

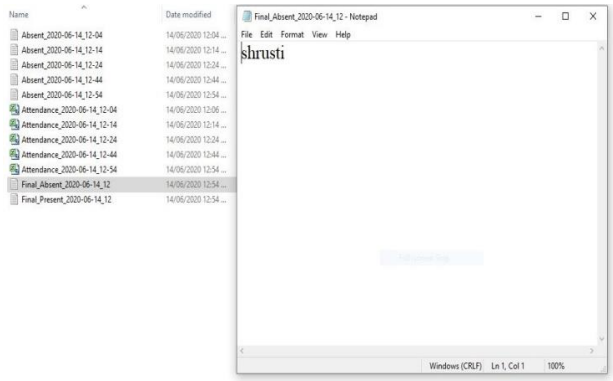

Fig. 7. Shows the final result of absentees

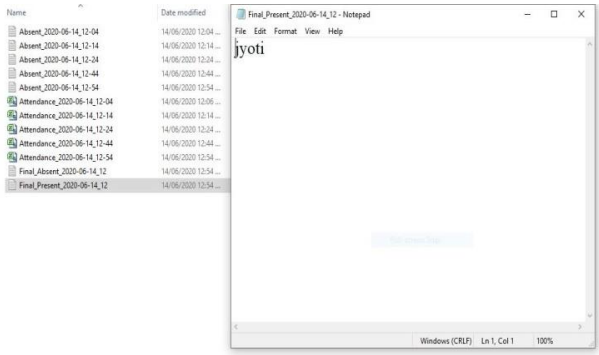

Fig. 8. Shows the final result of presentees

8. Conclusion

A mechanized student participation framework dependent on deep learning that can be utilized in crowded study halls, where the meeting pictures are taken by lens. We accept that our proposed framework dependent on face acknowledgment can be utilized to spare time for both educator and understudies, and to stop fraud participation. It will make two separate documents for presenties and absentees. This advance framework recognizes understudies and stores details in the document for the whole course for that specific educator. The intension of proposed framework is to recognize all fluctuated and numerous faces precisely.

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