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Attendance System using Haar Cascade Approach

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Abstract: The participation framework is utilized to track and screen whether an understudy goes to a class. There are various kinds of participation frameworks like Biometric-based, Radio recurrence card-based, face acknowledgment based and old paper-based participation framework. Out of them every one of the, a Face acknowledgment based participation framework is safer and efficient. There are a few examination papers zeroing in on just the acknowledgment pace of understudies.. This research focusing on a face recognition based attendance system with getting a less false-positive rate using a threshold to confidence We used Haar cascade for face detection of their strength and LBPH calculation for face acknowledgment. It is hearty against monotonic dark scale changes. Situations, for example, face acknowledgment rate, misleading positive rate for that and bogus positive rate with and without involving an edge in recognizing obscure people are considered to assess our framework. We got face acknowledgment pace of understudies is 77% and its bogus positive rate is 28%. This system is seeing students regardless, when students are wearing glasses or grown a beard development . Face Recognition of unknown persons is nearly 60% for both with and without applying threshold value. Its bogus positive rate is 14% and 30% with and without applying edge separately.
Keywords: Face Recognition; Face Detection; Haar-Cascade classifier; Open CV; attendance system

I. INTRODUCTION

Control of machines and their process with various technologies based on computer software is called automation. In this modern age, these advancements have proven to increase accuracy and also helping us to improve our livelihood. Innovations such as these save lots of labour work. One headway in the field of robotization is the Mechanized Participation framework supplanting the old and conventional participation stamping. The paper-based method of marking attendance is time-consuming and its complexity increases with the increase of overall strength. This case is invalidated in this mechanized variant has it saves time and an extra accompanies security as it likewise assists with forestalling intermediary of participation.

The objective of our proposed system is to create a face recognition based attendance system with getting a less false-positive rate in detecting unknown persons by applying a threshold and save their images We utilized Haar overflow for face discovery on account of their power and LBPH calculation for face acknowledgment. It is vigorous against monotonic dark scale changes. Our System even detects and saves the images of any unknown person in the class whose Information is not there in the database.

II. LITERATURE SURVEY

In[2] the authors proposed an attendance System using RFID cards. In this approach, The proposed RFID tag uses energy from the tag reader. The problem with this approach is that An unknown person can make use of a valid ID card and enter the University.

There are likewise papers including involving biometrics for participation. In[3] finger print is used for marking the attendance of students. There is a biometric sensor that will take the fingerprint, feature extraction done on that data. If it is for enrollment then that data is stored in the database else if it is for authentication the nth at data is started matching with the data in the database. The problem with this method is that for attendance students should go to the place where this hardware device is located or pass the hardware devicearoundthestudentsduringclasswhichcanbeadistractiontothestudents.And in [4] and [12] iris based attendance system is used. The problem with this approach is that it is sensitive to environmental factors.

In [1] authors proposed a face recognition based attendance system based on Eigen face recognition. But in the approach proposed in this paper, our system is not sensitive to face background, head orientations and it recognizes a person's face even if he grows a beard or wears glasses, etc.

III. PROPOSED SYSTEM

The proposed mechanized participation the executives framework depends on haar overflow for face location and the LBPH calculation for face acknowledgment. Graphical User Interface(GUI) for this system shown in Fig. 2 created using python module Tkinter which is the fastest and easiest way to create a GUI application.

This system provides functionalities such as taking images of students along with their details for the database, training theimages in the database and on the camera and start tracking people entering the class. at the point when understudies go into the homeroom this framework distinguishes the essences of understudies who are entering the study hall from the camera and pre-handled for additional handling. The stages in the proposed system are shown in Fig. 1. The implementation of each stage is mentioned in detail un the next section

IV. DATASET AND METHODOLOGY

We tested our system using a live real-time video in which students and unknown persons come and stand in front of the camera. Fig. 3 shows a few images after the pre-processing stage.
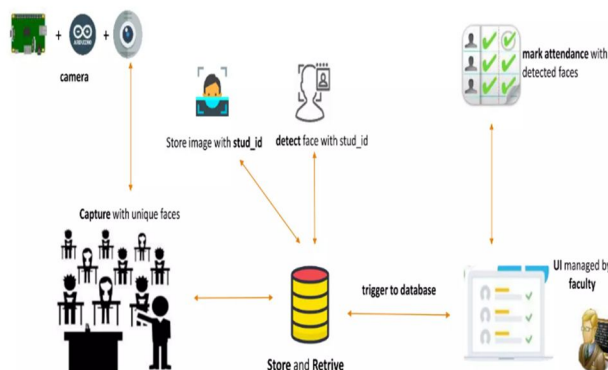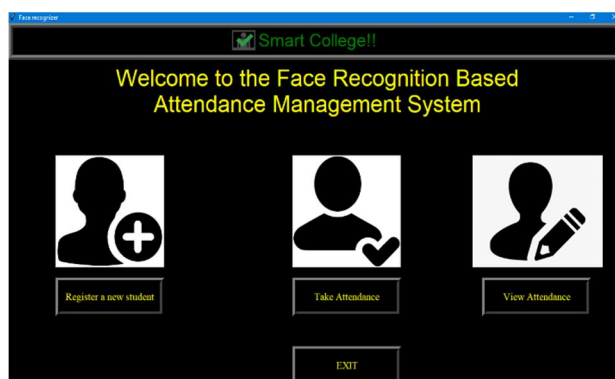

Fig.1.SystemArchitecture

Fig 2 System GUI

Algorithm 1
Pseudocode for the proposed system

Input: live video with student face visible
Output: attendance excel sheet

1. Transform each frame from RGB to grayscale

2. Apply the Haar Cascade classifier for face detection and get the Region Of Interest (ROI).

3. Now apply the LBPH algorithm on the ROI to get the features.

4. **if** *for enrollment* **then**
   features are stored in the database
   else if *for verification* **then**
   do Post-processing

3.Extracted and pre-processed faces of student sinthe dataset

Fig. 4. Example of relevant haar features

A. Preprocessing and Face-Detection

First we convert the edge from variety to dark scale. To detect the faces we used a haar cascade classifier which is proposed in [8] where a cascade function is trained and detect features in other images For this, we use haar highlights like edge, line, and four-square shape For an enormous picture or variable size of a picture, it takes a ton of calculations and highlights and the vast majority of them will be immaterial. But Ada Boost manages to select the best out of many as shown inFig.4[9].Then Region Of Interest(ROI) i.e containing faces is separated and shipped off next stage.

B. Face Recognition

For face acknowledgment, we chose to utilize the LBPH calculation due to its strength, the capacity to perceive both front and side faces and better contrasted with Eigenfaces and Fisher faces[6].the LBPH calculation is utilized as they find qualities that best depict a face in an image[5 They were many face affirmation computations and the LPBH estimation is better. This method is easier, within the sense it characterizes the image within the dataset locally and when are placement unknown image occurs we perform an equivalent algorithm and compare the outcome to every one of the photos inside the dataset.. It works better in different environments and light conditions than other algorithms.
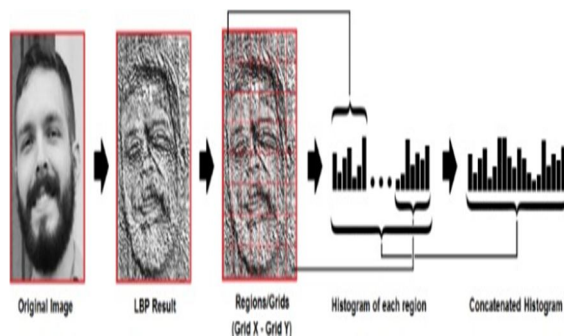
Performance Evaluation	percentage
Students Recognition Rate (Live video)	77%
false-positive rate (Students)	28%
Unknown person Recognition Rate (existing model)	60%
Unknown person false-positive rate (exisitng model)	30%
Unknown person Recognition Rate (proposed model)	60%
Unknown person false-positive rate (proposed model)	14%

Fig.5.processo f LBPH algorithmonan image

Local Binary Pattern(LBP) operation creates an image which highlights the characteristics of a image in a better way. It uses the concept of the sliding window and the parameters, radius and neighbours [7]. It is showed in Fig.6[10].
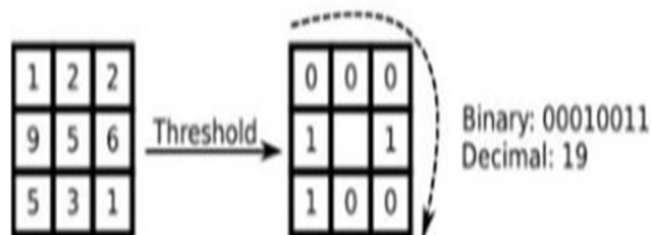

Fig.6.processofLBPonan3X3matrix

C. Post Processing

Presently to perceive the individual in the picture it compares(by applying Euclidean distance) the new histogram with the histograms from the preparation dataset and pick the histogram having most minimal certainty for example least distance, as lower confidences are better and also extract the ID corresponding to that histogram. If confidence is less than 50 then details belong to the extracted ID is shown on the frame[11] as in Fig.7, the names are updated into an excel sheet only if the student name is not in the excel sheet to avoid duplicate names as inFig. 8 Else word "Obscure" is displayed on the edge and if confidence is more prominent than the limit which is given value95, then the individual's picture is saved in a different organizer. This helps in recognizing any gatecrashers in the class and decrease some unacceptable grouping of understudies to an obscure individual.

V. RESULT AND ANALYSIS

We considered 3 feet as the distance of an object for recognition. As shown in Table 1, the Face recognition rate of students is 77% and its false-positive rate is 28 This structure is seeing students regardless, when students are wearing glasses or grown a beard development. Face Recognition of unknown persons for both existing and proposed models is 60%. This happened mostly due to detecting random objects in the background as the face of a person by face detection algorithm. Its false-positive rate is 14% and 30% for the proposed and existing model respectively.

The threshold value only affected the false positive rate of an unknown person. In the current framework, it is seen due to when the individual in the video turned his head more noteworthy somewhat then certainty an incentive for that edge might get more noteworthy than favourable filter value then the person in the frame is considered as an unknown person [13]. favourable filter value considered as 50 [11].

However, in the proposed framework, on the off chance that certainty is more prominent than 50 and 95, just an individual is considered as an obscure individual and that individual's picture is saved as an unknown person.

VI.   CONCLUSION

LBPH is one of the prominent technique for face recognition .Our system successfully recognizes a student with unintentional changes like wearing glasses or growing beardHere the problem is the dataset is small. In future,

 An effortcould be made to build a better dataset, that might practicallygive a more accurate result. We can Improve haar cascade classifiers through the synthesis of new training examples which can improve the recognition rate of unknown persons .A system alert(voice and visual) can be included if an industries detected in the class.

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