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FACE BASED CCTV ATTENDANCE MONITORING SYSTEM USING DEEP FACE RECOGNITION

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Abstract- *Face recognition of a human is an appreciable work in the field of security, particularly using the CCTV (Closed-Circuit Television) cameras, for security monitoring purpose. In spite of the fact that there is an advance in technology in the field of computer vision, they have made significant advances in face recognition system for easy attendance monitoring in schools and colleges rather than using manual attendance system that has many difficulties as there is critical maintenance of sensitive data and there is also less accuracy. The camera captures the image of the students and displays the name of the student along with their unique identification number on the graphical user interface of the system. Face detection technique has been incorporated using Haar Cascade technique and LBPH technique with 99.69% accuracy.*

Keywords – Face recognition, Face detection, Attendance monitoring, accuracy, Haar Cascade, LBPH technique, AMS, PSNR.

I. INTRODUCTION

As we have seen in numerous schools and universities the workforce individuals are dealing with the issue of intermediary participation, keeping up all transcribed report of understudy participation of each branch/class each day. It is an extremely troublesome undertaking for them. To diminish their work numerous strategies come into the picture.ID framework: In this framework, the understudy needs to convey ID card for participation reason each day. That ID card used to be swiped into the card reader that would read all the details of the student and mark their attendance.

Biometric framework: It will examine the unique part of the body, for example, fingerprints. At starting we need to store fingerprints of each applicant in the data set. During the attendance, present finger impression and also stored finger impression get checked. Consistently, the CCTV framework works to screen within a building for security. The framework's assets permit developers/designers to assemble PC vision-based applications to incorporate with CCTV. Face acknowledgment is a magnificent biometric strategy for verification. It is feasible to apply FR innovation for programmed participation taking at schools/colleges. There are a few advantages from attendance, thinking about utilizing the current camera framework, for example, to save time and exertion, give striking proof to quality affirmation and human asset the board assignments, stay away from go-between of irresistible infections.

Human face recognition has been a front runner and amazingly viable framework in the biometric confirmation for some applications, for example, entryway control, video checking the framework, network security, and human-monitor associations. The interest and time span of studies in this field are profoundly characteristic of its worth and intricacy, consequently unavoidably turning into a prevalent type of biometric confirmation.

Face recognition is a more exact and nearly quicker method than its counterparts. Face recognition gives an inactive recognizable proof, i.e., an individual which is to be distinguished doesn't fundamentally need to lead any activity for revealing his/her novel ID, all things being equal, the vigorous framework adequately catches the casings through the live stream, further empowering exact and reliable recognition. The facial recognition of the framework is constant and contact-less attendance monitoring. Haar includes: It gathers the highlights and looks of appearances. It takes all highlights by examining all pictures which it catches. Inside Image: After gathering all highlights it makes inward picture utilizing line include edge highlight, four square shape highlight, and so forth these are some pixel estimations.

II. LITERATURE SURVEY

[1] Classroom attendance check is a contributing factor to student participation and the final success in the courses. Taking attendance by calling out names or passing around an attendance sheet are both time-consuming, and especially the latter is open to easy fraud. As an alternative, RFID, wireless, fingerprint, and iris and face recognition-based methods have been tested and developed for this purpose.

Advantages: System eliminates the cost for extra equipment, minimizes attendance-taking time, and allows users to access the data anytime and anywhere. Smart devices are very user friendly to perform classroom

attendance monitoring. Teachers, students, and parents can use the application without any restrictions and in real-time. Since the internet connection speed has been steadily increasing, high quality, larger images can be sent to the server. In addition, processor capacity of the servers is also increasing on daily basis. With these technological developments, the accuracy rate of the proposed system will also be increased.

Disadvantages: Detection and recognition processes could be performed on smart devices once their processor capacity is sufficiently increased.

[2] Attendance recording of a student in an academic organization plays a vital role in judging students' performance. As manual labor involved in this process is time consuming, an automated Attendance Management System (AMS) based on face detection and face recognition techniques is proposed in this paper. The system employs modified Viola-Jones algorithm for face detection, and alignment- free partial face recognition algorithm for face recognition. After successful recognition of a student, the system automatically updates the attendance in the excel sheet. The proposed system improves the performance of existing attendance management systems by eliminating manual calling, marking and entry of attendance in institutional websites.

Advantages:

i) Automatic tracking of the records of the students

ii) Minimizing the manual labor and pressure on the lecturers for accurate marking of the attendance

iii) Minimizing the time required for marking attendance and maximizing the time required for actual teaching process

iv) Increase the efficiency of the overall system

v) Improving the security

Disadvantages:

It requires huge space and huge training data.

[3] Face Super-Resolution (SR) is a domain-specific super resolution problem. The facial prior knowledge can be leveraged to better super-resolve face images. We present a novel deep end-to-end trainable Face Super-Resolution Network (FSRNet), which makes use of the geometry prior, i.e., facial landmark heat maps and parsing maps, to super resolve very low-resolution (LR) face images without well aligned requirement. Specifically, we first construct a coarse SR network to recover a coarse high-resolution (HR) image. Then, the coarse HR image is sent to two branches: a fine SR encoder and a prior information estimation network, which extracts the image features, and estimates landmark heat maps/parsing maps respectively. Both image features and prior information are sent to a fine SR decoder to recover the HR image. To generate realistic faces, we also propose the Face Super-Resolution Generative Adversarial Network (FSRGAN) to incorporate the adversarial loss into FSRNet. Further, we introduce two related tasks, face alignment and parsing, as the new evaluation metrics for face SR, which address the inconsistency of classic metrics w.r.t. visual perception. Extensive experiments show that FSRNet and FSRGAN significantly out performs state of the arts for very LR face SR, both quantitatively and qualitatively.

Advantages:

i) It helps to improve the photometric recovery in terms of PSNR/SSIM.

ii) Provides a solution for accurate geometry estimation directly from very LR images.

Disadvantages:

It recognizes a single face only.

III. EXISTING SYSTEM

In traditional classroom environment, students' attendance management is one of the key factors to analyze the students' learning process and also to keep track of other factors like discipline, engagement and leads to effective learning and increase the success rate. There are several works in attendance management system to overcome the difficulties faced in a traditional classroom environment by using finger print, RFID, iris, wireless and face recognition-based methods. Also, there are many face detection based attendance management systems available in which they place a camera in a classroom, capture the image/video and recognize the students using face detection techniques [4]

Disadvantages of Existing System:

That means, number of sessions, number of enrolled face images per subject, days between enrollment and testing, etc. are not clearly reported. It seems that many of these recognition experiments have been conducted on images taken in only one session. Moreover, the subjects that are present in the query images are no more than 20, in many cases less than 10.

IV. PROPOSED SYSTEM

We propose a method to overcome the drawbacks of the existing techniques. Automating a system, without the students being aware of the attendance process and thus taking the attendance in a real classroom environment, makes the proposed application unobtrusive.

In this work, we explain the proposed algorithm for Student Attendance System. It consists of five steps: 1.enrollment,

2.capture of classroom images, 3. Face detection and description, 4. Query database and 5. Matching algorithm.

Advantages:

Design an unobtrusive and automated attendance management system with a high accuracy of face detection and recognition algorithm for any pose variation face using a high definition camera without human intervention.
To develop an attendance management system which identifies students' details and stores it in the database for the entire course for that particular instructor.

V. WORKING SYSTEM

Our solution is executed by Haar technology and AdaBoost classifier. Here we are making graphical UI (GUI) for putting away name and roll number of every student in document. While Data that is gathered of the student, it additionally produces dataset of the student faces and put away in the folder. Subsequent to finishing that, prepared pictures additionally put away in envelope which needed for face recognition. These are some fundamental and significant strides in our execution. Progressively situation when we place the camera close to homeroom entryway which catch live information Persistently. It catches pictures from live spilling of that camera.[5]

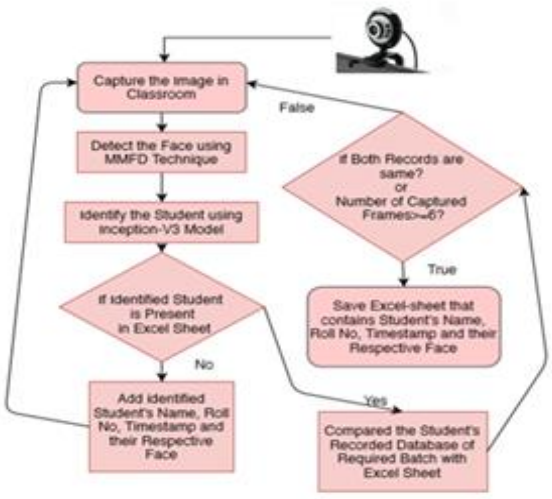

Fig -1: System Architecture of Proposed model

The images that are captured are compared with the images that are been stored in the folder at the time of registering the particular data. If the image is matching with the image that is been trained then the system will show the students name and their unique ID on the face which has been detected or recognized.

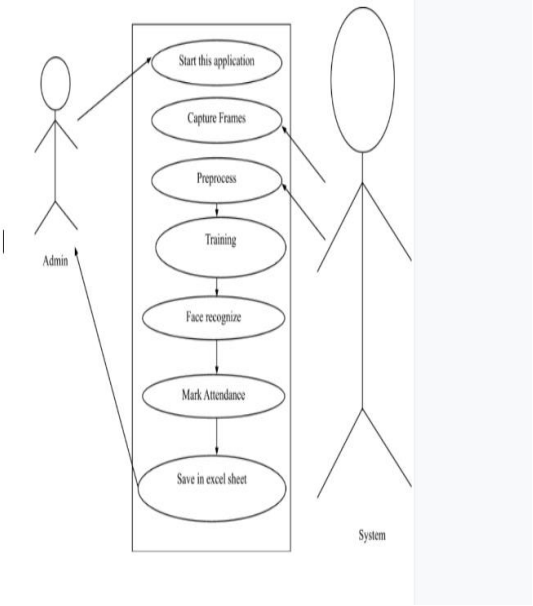

Fig -2: Flow chart of proposed model

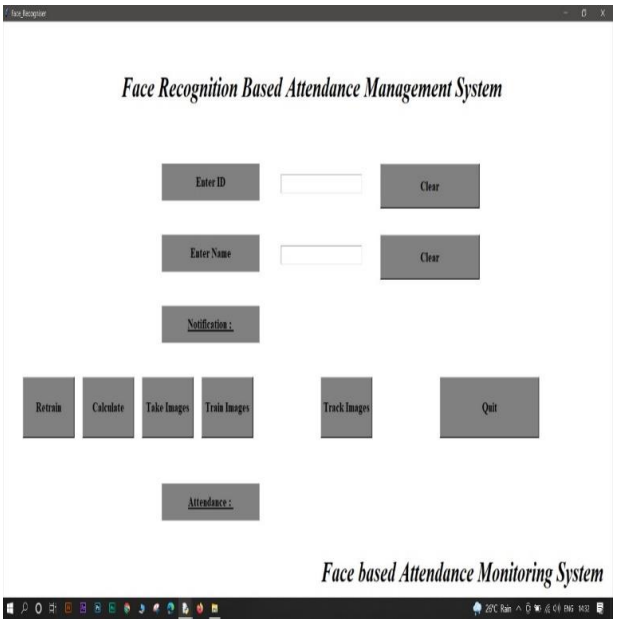

Fig -3: Face based Attendance Monitoring System

This data has been automatically stored in the attendance sheet that is the excel sheet along with the time and date. If the face is not matching with the image that has been stored at the time of registration then the unknown image is stored in the unknown folder. This system is very helpful for the attendance team to store the student attendance details [6] along with the timings and date the student has attended. This proposed system is very helpful for even government office attendance and even for industrial organization attendance management also.

VI. MODULES

Image Capturing:

Proposed System consists of a rotating high definition camera, placed in the classroom to capture all the students. From these captured image frames, the students' faces are detected using open cv face detection technique.

Face recognition:

We proposed face detection technique by incorporating Haar cascade classifier and LBPH techniques . This technique does not play out any sub-sampling, but it optimizes over all sub-windows. This method is much accurate to detect all varied faces positioned frontal, tilted up/right/left/down and occluded faces with 99.69% accuracy.

Experimental Setup

In this experiment we used open cv using Cascade model, the hardware platform is 64-bit operating system and Linux 16.4, processor 2.5 GHz, Memory 8 GB and 16 MP high definition camera. The setup was tested in a real classroom that contains 20 students with all variation of poses. We tested the proposed face detection method and existing face detection techniques using the benchmark dataset (FDDB)[7] . This dataset contains images of human faces in multiple poses. Out of 3500 of FDDB images, Haar Cascade Classifiers technique detects the face with an accuracy of 94.71%.

Training Phase:

The number of students detected depends on the seating arrangement of the students in the classroom. Fig1 contains frontal and occlude faces and contains frontal, tilted and occlude faces. The proposed face detection technique can detect all faces presents with the rate of 100% accuracy. From detected faces, we identified the students using face recognition algorithm, for Frame-1 the correctness of true identification rate is 100% while for Frame-2 it is 90%. The accuracy of student recognition can be improved by using more images of each student in the training phase.

LBPH Face Reorganization:

Local Binary Patterns Histogram algorithm was proposed in 2006. It is based on local binary operator. It is widely used in facial recognition due to its computational simplicity and discriminative power.

The steps involved to achieve this are:
Creating dataset
Face acquisition
Feature extraction
Classification
The LBPH algorithm is a part of opencv.

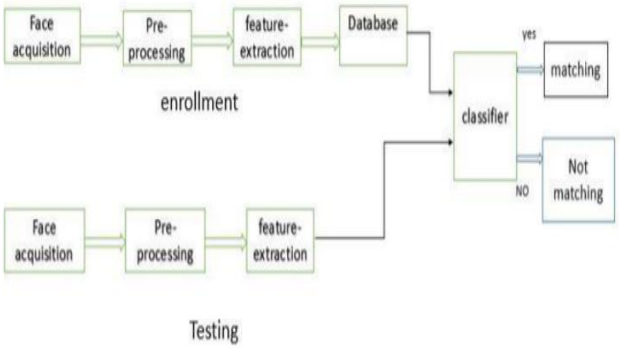

Fig -4: Block Diagram

VII ADVANTAGES

1. It can store large number of data.
2. It can train any number of images captured or identified.
3. Accuracy of this algorithm is high.
4. It can capture the image from a long distance also accurately.
5. There will be no network related problems because network connectivity is not necessary.
6. System is simple to operate and function and it is not complicated to run program.

VIII CONCLUSION

Essentially this framework work for improving the working of the framework in each area like schools, universities, associations, organizations. Catching live pictures from the camera and applying various strategies of face location also, face recognition which will lessen manual or customary work. In our solution, by making an interface we produce the dataset. We prepared the pictures utilizing Haar Cascade. In the wake of finishing preparing it will effectively distinguish and perceive faces and nonappearances. When putting away pictures and thought about pictures coordinated with then participation sheet get refreshed consequently with time and date. As it put away the entering season of each understudy it turns out to be simple for employee to keep track of the schedule of understudy.

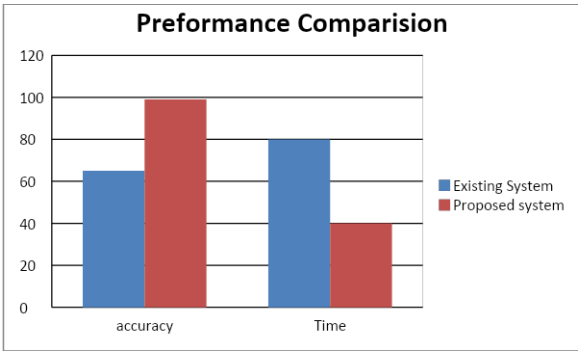

Chart -1: Performance Comparison

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