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Automatic Attendance System Based On Face Recognition and Face Detection

R.Devi[1], B.Srivasanthi[2], T.Suvathi[3] ,S.Umamaheswari[4]
Associate Professor[1], UG Scholar[2,3,4]
[1,2,3,4]Dept. of CSE, Panimalar Engineering College, Chennai

ABSTRACT:
In the traditional system, it is hard to be handle the attendance of huge students in a classroom. As it is time-consuming and has a high probability of error during the process of inputting data into the computer. Real-Time Face Recognition is a real-world solution which comes with day to day activities of handling a bulk of student's attendance. Face Recognition is a process of recognizing the students face for taking attendance by using face biometrics. In this project, a computer system will be able to find and recognize human faces fast that are being captured through a surveillance camera. Numerous algorithms and techniques have been developed for improving the performance of face recognition but our proposed system uses Haar cascade classifier to find the positive and negative of the face and LBPH (Local binary pattern histogram) algorithm for face recognition by using python programming and OpenCV library. Here we use the tkinter GUI interface for user interface purpose.

KEYWORDS: - *Haar cascade classifier, LBPH algoritham*

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I. INTRODUCTION :

The technology aims in imparting tremendous knowledge oriented technical innovations these days. Machine 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 and the teacher of an educational organization. With the advancement of the Machine 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). There are so many advantages using this technology. Some of them are as follows - Automation simplifies time tracking, and there is no need to have personnel to monitor the system 24 hours a day. With automated systems, human error is eliminated. - A time and attendance system using facial recognition technology can accurately report attendance, absence, and overtime with an identification process that is fast as well as accurate. - Facial recognition software can accurately track time and attendance without any human error -Facial biometric time tracking allows you to not only track employees but also add visitors to the system so they can be tracked throughout the worksite.

II. LITERATURE SURVEY:

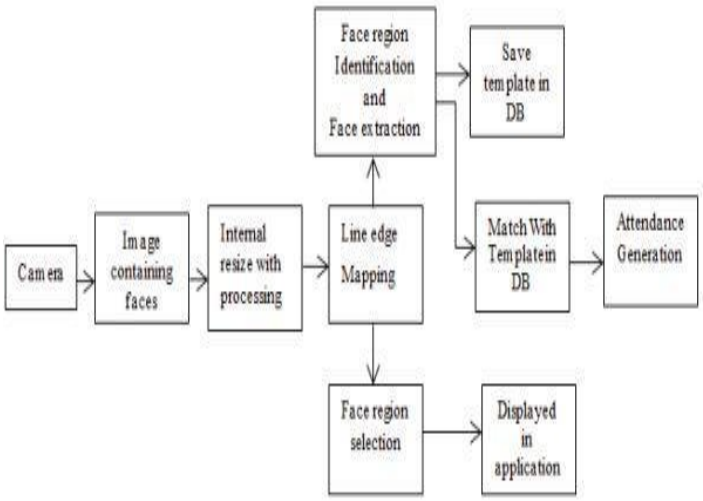
There were many approaches used for dealing with disparity in images subject to illumination changes and these approaches were implemented in object recognition systems and also by systems that were specific to faces. Some of the approaches as follows: - A method for coping with such variations was using gray-level information to extract a face or an object from shading approach [1]. The more reason gray scale representations are used for extracting descriptors instead of operating on color images directly and also gray scale simplifies the algorithm and reduces computational requirements. Here in our case, color is of limited benefit and introducing unnecessary information could increase the number of coaching data required to attain good performance [2]. Being an ill-posed problem, these proposed solutions assumed either the item shape and reluctance properties or the illumination conditions [3]. These assumptions made are too strict for general beholding, and so, it didn't persuade be sufficient for face recognition. The second approach is the edge map [4]

of the image which could be a useful object representation feature that's insensitive to illumination changes to certain event. Edge images might be used for recognition and to realize similar accuracy as gray level pictures. The edge map information approach owns the advantage of feature-based approaches, like invariance to illumination and low memory requirement. It integrates the structural information with spatial information of a face image which can be done by grouping pixels of face edge map to line segments. After thinning the edge map, a polygonal line fitting process is applied to come back up with the edge map of a face [5] [6] [7] There is one another approach through which the image disparities because of illumination differences are handled; it's by employing a model of several images [8] of the identical face which is taken under various illumination conditions. During this kind of approach, the pictures captured may be used as independent models or as a combined model-based recognition system [9] [10].

PROPOSED SYSTEM:

When we run the program, a window is opened and asks for Enter Id and Enter Name. After entering respective name and id fields then we have to click Take Images button. By clicking the Take Images button, a camera of running computer is opened and it starts taking image samples of person. This Id and Name is stored in Student Details folder and file name is saved as Student Details.csv. It takes 60 images as sample and stores them in Training Image folder. After completion it notifies that images saved. After taking image samples in order to train the image samples we have to click Train Image button. Now it takes few seconds to train the machine for the images and creates a Trainner.yml file and stores them in TrainingImageLabel folder. Now all initial setups are done. After completion of take images and Train images we have to click Track images button which is used to track the faces. If the face of particular student is recognized by the camera then Id and Name of person is shown on Image. Press Q (or q) for quit this window. After coming out of it, attendance of particular person will be stored in Attendance folder as csv file with name, id, date and time and it is also available in window.

SYSTEM ARCHITECTURE:



MODULE DESCRIPTION:

* **IMAGE ACQUISITION**
* **PRE-PROCESSING IMAGE**
* **FACE DETECTION**

FACE RECOGNITION

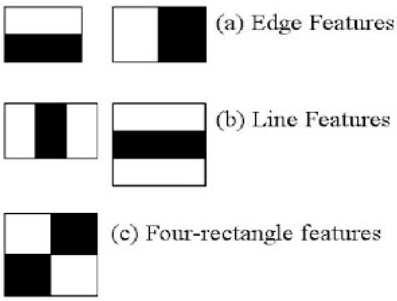
IMAGE ACQUISITION:

Image acquisition are often accomplished by digitally scanning an existing photograph or by using an electro-optical camera to accumulate a live picture of a topic . Video also can be used as a source of facial images. The most existing face recognition systems contain one camera.

PRE- PROCESSING IMAGE:

The system captures around 50 images of every individuals face. The images are converted into grey scale as

LBPH operates using images in grey scale and the images are stored in a folder. The stored images will be saved with a name and ID unique to that person. In Image pre-processing HAAR CASCADE algorithm was used to train the image. HAAR CASCADE features are more useful in image processing.



FACE RECOGNITION:
Facial recognition may be a way of recognizing a person's face through technology. A face recognition system uses biometrics to map countenance from a photograph or video. It compares the knowledge with a database of known faces to seek out a match. Facial recognition can help verify identity, but it also raises privacy issues.

FACE DETECTION:
Face detection may be a technology getting used during a sort of applications that identifies human faces in digital images. Face detection also refers to the psychological process by which humans locate and attend to faces during a visual scene.
IMPLEMENTATION:

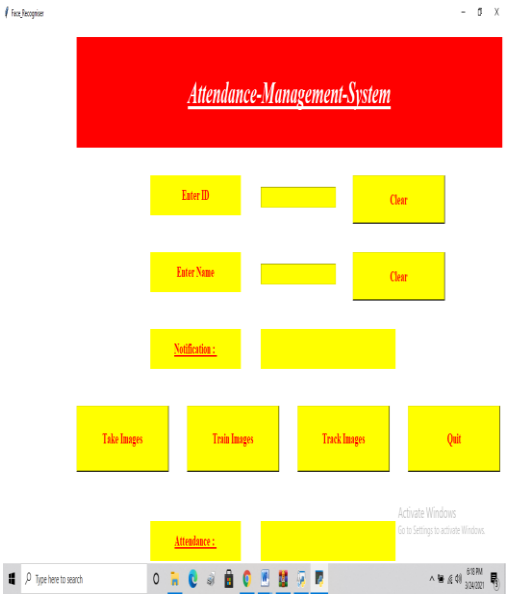
1 HARDWARE REQUIREMENTS

- Hard Disk :500GB and Above
- RAM :4GB and Above
- Processor :I3 and Above
- Webcam 1

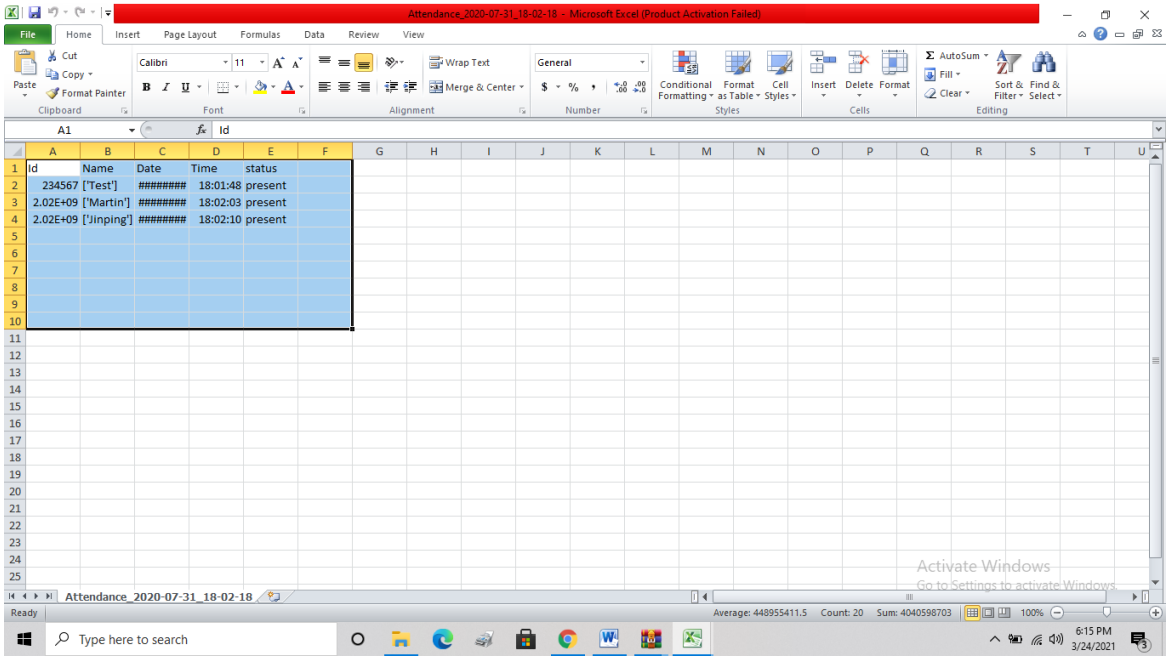
3.4.2 SOFTWARE REQUIREMENTS

- Operating System: Windows 7 , 8, 10 (64 bit)
- Software : Python
- Tools : Python3.7 IDLE, Spyder

SCREENSHOTS:
STUDENT ATTENDANCE SYSTEM



ATTENDANCE VERIFICATION:



III. CONCLUSION:

We have implemented an attendance management system for student's attendance. It helps to reduce time and effort, especially in the case of large number of students marked attendance. The whole system is implemented in the Python programming language. Facial recognition techniques used for the purpose of the student attendance. And also, this record of student attendance can further be used mainly in exam related issues like who are attending the exams and who are not attending.

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