AUTOMATIC ATTENDANCE SYSTEM BY FACE RECOGNITION

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Abstract:

Now-a-days attendance is the major process that can be done in any educational institutes and it is a time taking process for every educator in a piece of paper. In this project we take the attendance by recognizing the face of the students and mark the attendance in a csv file with the date and time so that we can save the time and the records of student data and details of student should be stored in a particular location or in a particular file. This research is aimed to develop less intrusive, cost effective and most efficient as automatic attendance system through face recognition using Machine learning with Python. Where there are the libraries in OpenCv that can perform the operations such as detecting, training, testing to get the attendance of a student. In this project face recognition and face detection is used. Where face detection is to detect the face of the student and store it in a dataset after that while taking the attendance it compares the image that stored in a dataset if matches with one of image in a dataset then the attendance will be recorded.

Keywords: OpenCv(Open source computer vision library, LBP(Linear binary pattern)

Introduction:

Maintaining and monitoring of attendance play a vital role in every organization. Automatic attendance system through face recognition performs like the daily activity of attendance making like a traditional process with reducing of person intervention. The earlier techniques that failed to store the data in a files and also fail in storing of multiple faces or detection of faces, variations. The proposed system aims to overcome those faults which are having in the existing systems and provides the characteristics such as detection of faces, extraction of features, detection of extracted features, and to analyze and store the student details in a specific file or path. The system integrates techniques such as image contrasts, integral images, color features and cascading classifier for feature detection. This project will gives the good accuracy due to the use of features like edge, color, LBP.

This project tests for more number of testcases. The testcases can be checked in a room to test the accuracy of taking the attendance through face recognition. This project comprises for only one student who can sit before the camera and also the student must be registered. But the system takes to store the details of multiple number of students. This can be tested at the light area conditions and dark area conditions, for various facial expressions, for various backgrounds and also for partial faces.

Literature Survey:

There are multiple ways to do this project such as using a real-time computer vision algorithm in automatic attendance management system. The system installed the camera with non-intrusive, which can snap images in the classroom and compared the extracted face from the image of the camera capturing with faces inside the system. This system also used machine learning algorithm which are usually used in computer vision. But in this project we work on HaarCascade classifier which used to extract the features of faces. This is mainly a object detection algorithm used to identify faces in an image or a real time video. The model created from this training is available at the OpenCV .These models includes eyes detection, face detection etc…

The main purpose is the features on the image makes it easy to find out the edges or the lines in the image, or to pick areas where there is a sudden change in the intensities of the pixels. The haar feature continuously traverses from the top left of the image to the bottom right to search for the particular feature that means edges traversing. The advantage of the edges feature-based approaches is to integrate the structural information by grouping pixels of face edge map to line segments. After comparing those pixel calculations and done the further process.

Objectives:

The objectives for the project are:

1)Detection of face and store it as sufficient number of images.

2)Extraction of features for the detected face for further testing process

3)Storing of details of a person in a training dataset

4)Testing of the faces with the trained image

5)Automatic modifications in the files without any other persons.

Methodology:

The methodology that used in this project is HaarCascade classifier and LBPH algorithms:

At first it resizes the image where the original image that we have considered is very large after classifying or resizing of images it loads the image and convert it into a gray-scale images the reason for this gray channel is easy to process and it is computationally less intensive as it contains only one channel of black-and-white. After converting RGB image to gray we further classifies or extract features of face using face classifier and using in built function to detect multiple faces.

The another algorithm used for this project is LBP(Linear binary pattern):

It actually done 2 methods:

1)**Face recognition**: It recognizes the facial images which are already resized and converted to gray scale image.

2)**Face detection**: It is used to find the face

And face recognition does 2 methods such as:

Verification: It basically compares the input facial image with the facial image related to the user which is requiring the authentication.

Identification: It basically compares the input facial image with all facial images from a dataset The working of the project is :

At first it captures the images of student then store it in a training dataset module when we click on the take attendance button by using LBP it compares the integrated image with the original image if it matches then it marks the attendance otherwise it doesn't marks or records the attendance.

Fig: System architecture

Test cases:

Testcases for this project is as follows:

S no	Test cases	Description	Actual Output	Expected Output	Results
1	Registered Person	If the person is registered and detected	Present	Present	Pass
2	Registered Person	If the person is registered and not detected	Unknown	Present	Fail
3	Unregistered Person	If the person is not registered	Unknown	Unknown	Pass
4	Admin Login	If the admin wants to save the profile and the password is correct	Login Successful	Login Successful	Pass
5	Admin Login	If the admin wants to save the profile and the password is not correct	Password incorrect	Login Successful	Fail

Experimental analysis and results:

Fig: User interface

When we observe the below figure we can see that it is a user interface which we can enter the details of the student for the newly registered and also to take the attendance for already registered students.

When we click on take images it goes through the training algorithm and store the images of student in a training dataset nearly 10 copies with different angles after storing we have to save the profile otherwise it cant be save the images that are trained.
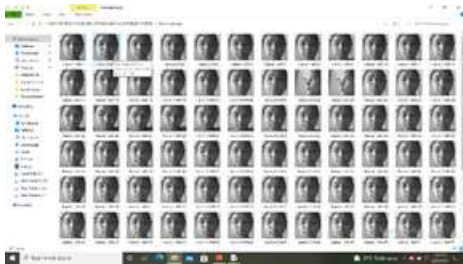

Fig: Trained images

After saving profile the value at total registrations updated as well as it displays Profile saved successfully. And the student who have registered those details stored in a csv file with their name and id which is easy for checking for the lecturers as follows:
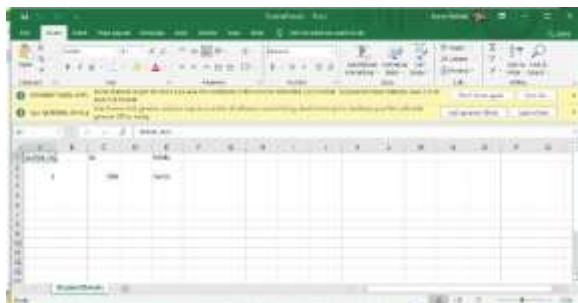

Fig: Student details in csv file

After that clicking on take attendance it on the webcam and captures the face of the person and detects some time when we click on Q and go to the csv file and checks there should be recorded the attendance of the person with the date and time that sits infront of camera .

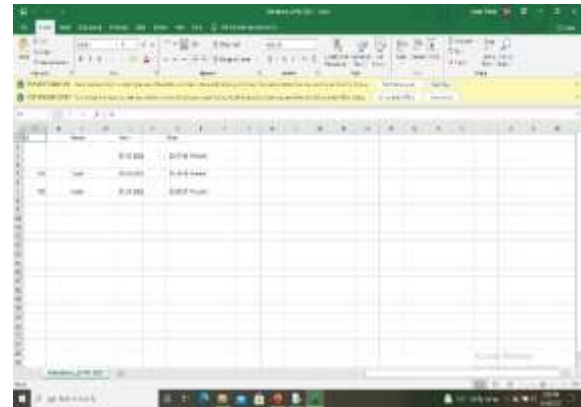This will be the result in the csv file after recording the attendance

Fig: Attendance file

Conclusion:

The attendance with face recognition system is very effective and very efficient and convenient to maintain the records in the system rather than in the papers or books. It reduce the time for teachers and also maintains the different attendance sheets for different classes at different time and date.

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