ADVANCE FACE DETECTION SYSTEM

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ABSTRACT

Nowadays face detection is attracting much attention in the digital era to access the information for the security purpose. The face detection system is used for the information processing technology in different areas. The present research paper is used to detect the face of predefined images with the help of an application which detect the face using camera and detailed attendance is recorded in the excel file using the name of the student and time. The present application shows the accuracy reliability and robust for the face recognition system that can be practically implemented in the real life as an automatic attendance management system.

Key Words: face detection, information security, attendance management system, face encoding, Machine learning, feature extraction.

INTRODUCTION

In today's era, Face recognition is important for image processing, it is also used in many other fields. This project is based on Artificial Intelligence and Machine learning which uses an SVM classifier for the detection and differentiation of images. Attendance is also an important feature of the face recognition system. Face can be detected after the completion of various processes like encoding gradient etc. Handling of attendance records plays an important role in any attendance system which is done accurately by this kind of attendance system.

A verbal and paper-based system is a traditional way of taking attendance. While an automated management system reduces human efforts also, the system integrates techniques such as image contrast, integral images, color features and cascading classifier or face detection. The system provides accuracy due to heavily used features. Even this system is tested for various test cases for this we used various face recognition libraries for detection and recognition.

Eigen faces is the mathematical principle component used for the distribution of faces in images. It's a biometric approach that employs an automatic way to detect the face. For face detection, the major approaches are face recognition and then its normalization first it decodes the image and locates the image pixel for finding the face from the image by the steps of grading and encoding then for the further process of detection it encodes the face and creates many measurements, nearly 128 measurements for determination. As the image contains a large amount of background area then after the face detected for detection, generally, we use a machine learning based library but here we use SVM classifiers linear modal for detection purposes. And we also used SQL database for the saving information of the member and insertion of tables, and also for updating information. The system can easily encode the face as compared to the human eye, so, it is one of the plus points in it. Face recognition is not used widely nowadays because some required features are not yet available such as it is needed to have the ability to recognize faces under different variations, even when training images are severely limited. But soon these features will be updated in upcoming years. We see various automation technologies that have replaced humans. Such technologies are near about perfect and provide the most accurate and error less results.

After face detection, the system also gives the record of attendance in an excel document. Thus, we get a document having an attendance record of all members enrolled in the system. This saves a lot of time as everything is automatic and we just have to collect the documents from the system.

REVIEW OF LITERATURE

For the present study the researchers have refereed the published and unpublished research papers, conference proceedings, books and thesis from the various s sources.

➢ The paper entitled "An introduction to Face recognition Technology" by Shang, Hung, IC media corporation highlighted

the use of generic framework and the author has used the various existing algorithms for the face recognition system such as artificial intelligence, neural network, machine learning etc. [5]

➤ The author Ramesha K, K B Raja, Venugopal K R, L M Patnai in his research paper titled" Feature Extraction based Face Recognition, Gender and Age Classification" highlighted that the face recognition using the images of like nose, mouth, eyes and face etc. The author has also highlighted that the face recognition comparison of gender and age factors and conclude that the 98% and 94% recognition is based on the age and gender factors.[6].

➤ The author has concentrated on the design and implementation of face recognition attendance system using the biometric techniques. The present paper records the initial information in the template and the same template have been used for the face and eye recognition and it will take an automatic attendance by capturing the facial information. The author also makes use of databases to store the template and images for attendance processing system[4]

➤ In the present paper the author proposed the algorithms like viola, histogram of Oriented Gradients with the help of support vector machine algorithms for face detection attendance system. The Quantitative analysis also carried out by using the MATLAB tools [3].

OBJECTIVES

- To study the various existing automatic attendance systems
- Identify the suitable technology for the present application
- Design the detailed process f low for the preset application
- Implement the advanced face recognition attendance system

RESEARCH METHODOLOGY

Technology Used

➤ We are using our core platform as python which is one of the best and easiest programming languages.

➤ We used supporting editors such as **PyCharm.** It is one of the best editors for most of the programming processes.

➤ **Open CV**: This is a library used for image recognition, image processing and video capture. Thus, the main function of the system i.e., face detection is carried out using this library.

➤ **Pillow:** This module collectively helps in making GUI. The interface that we see on running the program is built with help of this module.

➤ **Face-recognition:** This module is mainly used to detect the various kinds of faces. This module compares and identifies the faces using in-built python libraries.

➤ **Wheel:** It allow for faster installation in the package distribution process. Whenever we install anything in python wheel makes its faster and efficient.

➤ **Dlib**: This machine learning package is used to detect the faces. It functions same as that of OpenCV and helps in image processing.

➤ **NumPy:** This module is used for working in domain of linear algebra, Fourier transformations and matrices. It also helps in working with multi-directional arrays.

➤ **os:** This is a basic module used for interacting with operating system. It simply connects the user and computer and thus, conveys our commands to computer on which results are displayed.

➤ **harrcascade:** This is another element used for face detection process. It is used for training of positive and negative images which plays major role in face differentiating process.

➤ **detectMultiScale:** When any face is detected in the image provided to system or in the webcam, we see a rectangle around the face. Thus, this module returns that rectangle with coordinates(x,y,w,h).
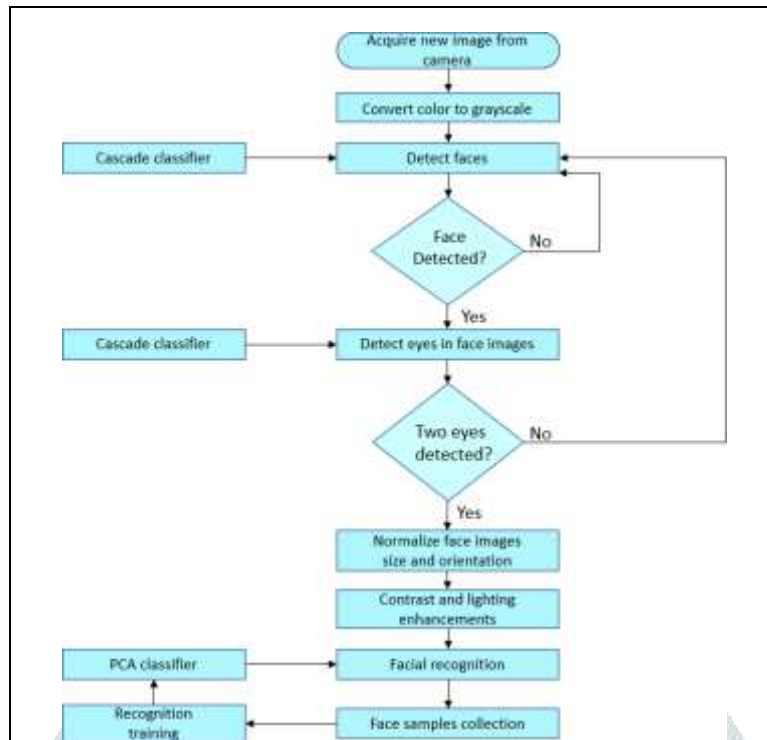
PROCESSFLOW

Figure1:Flow chart of working of the system

SYSTEM DESCRIPTION

➢ The system first acquires the image by the camera which will take the face image and it is converted into the gray scale color.

➢ Detect the image by using the cascade classifier and repeat the process till to detect the proper image.

➢ Once both eyes detected normalize the size and orientation of face images

➢ Adjust the contrast and lighting enhancement can be adjusted

➢ Facial recognition and face sample collection is done and recognition training is applied on PCA classifier

➢ In the above steps the machine learning algorithm is used for identification of pattern their height, weight and later on rescaling as per the face adjustment. The most challenging is to convert the particular face into number because the machine learning understand only the numbers and it is called as the vectors to perform the different operations

WORKING PROCESS AND IMAGES

Altogether, we get the result in following manner. Here are some images showing how we see the rectangle and registered information around the face.

First of all, when we run the code, an interface which is home page of the system appears in front of us showing multiple buttons on the system as shown in below figure:

Figure 2:Home page of system

Further on clicking the student details button, a new tab or interface opens up in front of us in which we can fill in student details and store them on left part. Whereas, we can see the information of the registered students in right side. Here is the image of student details tab:

Figure 3:Student details tab

After we have stored the information, it is displayed in our database as follows:

Figure 4:Database showing information

After closing student details tab, we come back to home page where in on clicking the button saying "Go for Attendance" our webcam opens up and starts capturing and we can see a rectangle around the face along with name and other details. Here are some sample results and images of how the information is displayed:

Figure 5 : Sample result for Elon Musk
Source: https://th.bing.com/th/id/OIP.06VyQGpJqXYtX24JFfiBbgHaE8?pid=ImgDet&rs=1

Figure 6:Sample result for BillGates
Source:https://image.cnbcfm.com/api/v1/image/104891709-Bill_Gates_the_co-Founder.jpg?v=1558120888&w=1400&h=950

Figure 7: Sample output of team member Ashish Mundhe

After the faces have been captured by webcam, we can see that attendance along with date and time has been noted in the system:
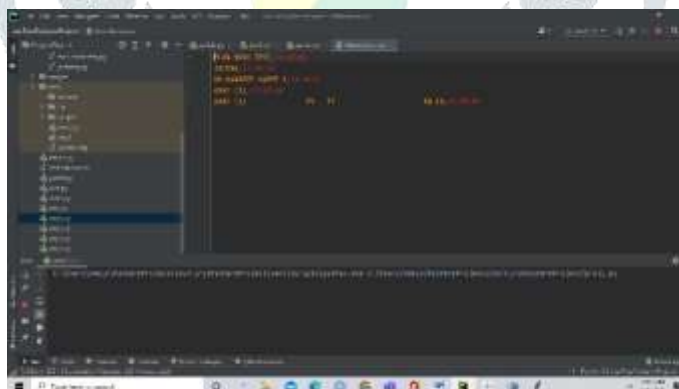

Figure 8:Attendance noted in system

Also, if anyone wants to learn more about exactly how the system works, he/she can click on help button and then further image will open showing working of system:
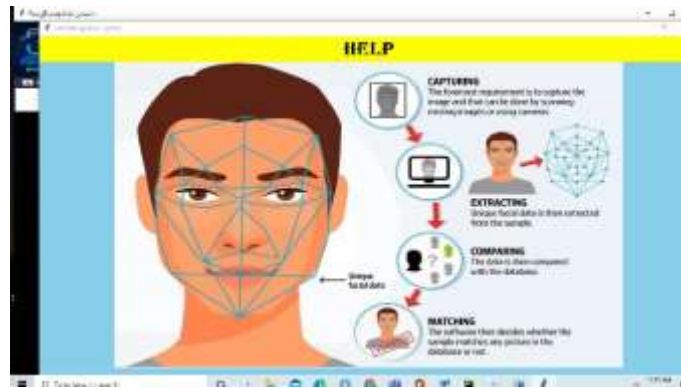
Figure 9:Help page Source for inside image used:
https://www.bing.com/images/blob?bcid=S6MptJbsWwcDwA

CONCLUSIONS

Face recognition is the one of the most secured application for the attendance management system the same time it is very much challenging and important techniques for recognition. Face recognition advantages is user friendly and secured and safety. In this paper we have developed attendance management system. We have tried to overcome the issues such as generic framework for face recognition system. This paper will help to the research community to better understanding about face recognition.

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