

Face Recognition using LBPH Algorithm, Python and OpenCV

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ABSTRACT: Face recognition from media (such as image or video) is a popular topic in today's research field. Many public places usually have surveillance systems for video and image capturing and these systems have their significant value for security purpose. It is widely acknowledged that the face recognition have played very important role in these type of surveillance system as it doesn't need the object's cooperation. The actual advantages of face based identification over other biometrics are uniqueness, simplicity and acceptance. As human face is a dynamic object having high degree of variability in its appearance and too little uniqueness, that makes face detection a difficult problem in computer vision. In this field, accuracy and speed of identification is very major issue.

The main goal of this paper is to evaluate our face detection and recognition methods, which provide complete solution for image based face detection and recognition with higher accuracy, better response rate as an initial step for video surveillance by using time as minimum as possible. Solution is proposed based on performed tests on various facedatabases in terms of subjects, pose, emotions, race and light. In other words, it is a system application for automatically identifying a person or any other object from a still image or video frame.

Keywords: Face Detection, Face Recognition, Biometrics, Face Identification, python and open-cv.

I. INTRODUCTION

Human Face detection and recognition always play crucial role in application such as security system, credit and debit card verification surveillance on identify criminal public places and

also in today's smart gadgets security systems. The main objectives of the system are to create a facial recognition system that can be emulated and eventually overcome this capacity of human or reduction of error as little as possible. This recognition system focuses especially on the human frontal faces. Multiple face recognition algorithms have been developed and each has its own strength and weakness^[1]. Most of the time we look at a face of persons and are able to recognize it instant if we are already familiar with the faces. This natural ability, if possible, can be justified and can be used for real life applications algorithms. There are many face detection algorithms developed as per requirement. The first one is a local face recognition system, which uses facial features of a face to identify the face with a person. The second approach or global face recognition system use the whole face to recognize a person. The above two process have been implemented one to another way by another algorithms using totally different procedure to overcome drawbacks. So our idea is to implement facial recognition system which is capable of detecting human faces as accurate as human as or more accurate than humans^[2].

II. RELATED WORK

There are three main steps in this system:

1.1 Face Tracking: The objective of this step is to detect object of face in real time and to keep tracking of the same object until the object get out from capturing area. Here we use the training samples images of other objects of your choice to be identify and track by training classifier this is called haar cascade classifier. Haar cascade classifier consists of two types of image data set. The first image dataset is called positive image

dataset because it contains the images of object you want to classify. Another image dataset is called negative image dataset because It contain all that image you do not want to identify^[4].

1.2 Face Detection

This face detection process actually identifies the image is face image or not. Detection process actually works on Haar Cascade classifier. Object Detection using Haar feature- based classifiers is an effective object detection method which are xml file. Accuracy depends upon how much pictures xml file get during training of haar cascade file.

1.3 Face recognition

Face recognition done via YML file. YML file work together with XML file. XML haar cascade file used to detect face and YML file shows that whose face it is^[5]. Because every person has its own and unique input ID so it gives us output of that ID whose face is matched.

III. PROPOSED WORK

Systems design is a process that defines architecture, components, modules, files, interfaces, and data requirements. The face detection technology that helps locates human face in digital images and video frames.

It has following Steps

1. Face Detection:

The objective of the program given is to detect face in real time and to keep tracking of the same object. This is used to collect sample face images from real time video .This algorithm collect fifteen images after detecting face in video. All captured are stored in folder called dataset.

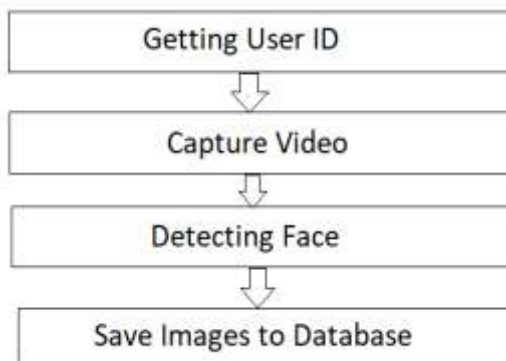


Figure 1: working Method

2. Trainer:

This algorithm used to train YML cascade file. This algorithm get images from dataset folder and get common features between dataset images then YML trained file is produced on output.

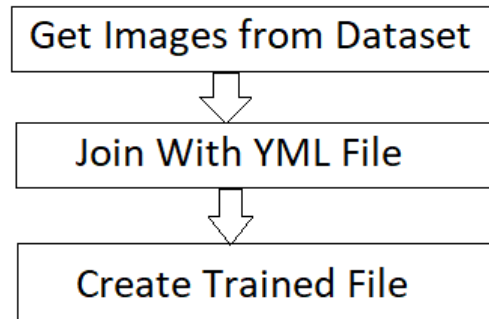


Figure 2 : Creating Training file

3. Recognition:

This algorithm is final step in face recognition. This algorithm use both frontal-face-haar-cascade file and Trained cascade file. Frontal face haar cascade file detect face from real time video then particular face is find from these video captured images.

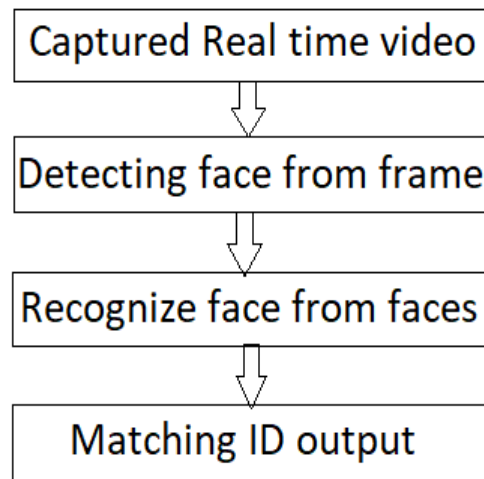


Figure3: Face Recognition

IV. RESULTS

In this method, computers are trained to recognize visual element which are trained via database. Database is collection of images. Computer find similarities in images and create a trained file. There are threshold between images , images below this threshold are knows as non-match and above threshold images are known as matched^[9].

The system has created a database during face detection event by its own then these images are stored in dataset folder in program directory, as such:

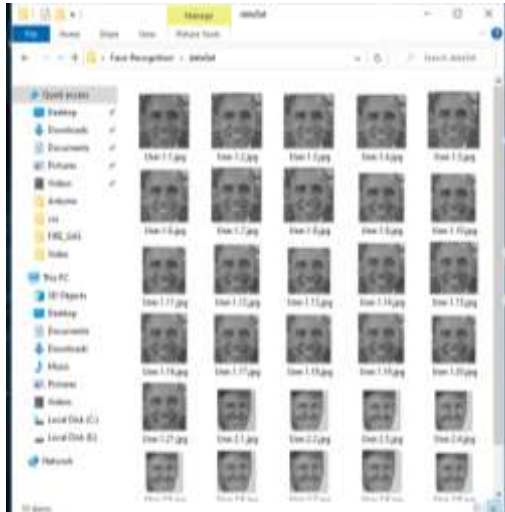


Figure 4 : Dataset Directory

The performance of this method is compared with other existing face detection and recognition methods. It is observed that better accuracy in recognition is achieved with the proposed method and also require very low processing power because of python and opencv . This face Recognition using KLT algorithm plays a vital role in a wide range of applications. It is high rate accuracy algorithm which is perfect for identifying a person .

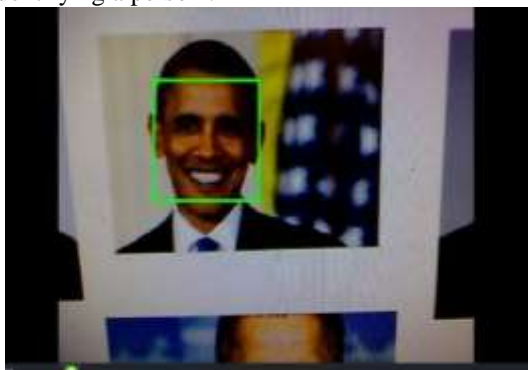


Figure 5 :Final Output

As shown in output these is detection of trained person. We draw rectangular on matched area . This system will work perfect in every condition such as change in contrast , brightness or angle^[10]. Accuracy is dependent on number of features , more the number of feature means more accuracy but also require more processing power

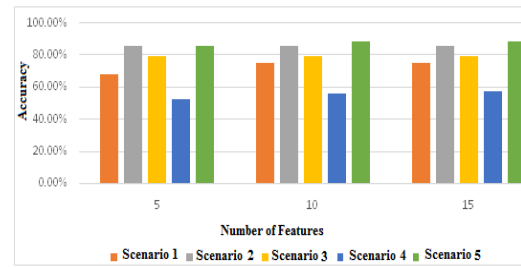


Figure 6: Features vs accuracy

V. CONCLUSION

Face recognitions system can be used to identify unknown person. In realtime scenarios, PCA outperforms other algorithms. This system developed only by recognizing the 35-degree angle variations that should be improved in future. Other recognition can be fused with face recognition systems which can used under poor lighting conditions. Our system will perform well. It is well suited for single board computer and also for ARM processors and controllers.

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