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Design and Development of Android Application for Face Detection and Face Recognition

Prof. K. V. Warkar[1], Priya Kalmegh[2], Himani Mahakalkar[3], Sneha Sabane[4]

[1]*Prof. K. V. Warkar, Dept. of Computer Engineering, BDCOE, Sevagram, Maharashtra, India*
[2]*Priya Kalmegh, Dept. of Computer Engineering, BDCOE, Sevagram, Maharashtra, India*
[3]*Himani Mahakalkar, Dept. of Computer Engineering, BDCOE, Sevagram, Maharashtra, India*
[4]*Sneha Sabane, Dept. of Computer Engineering, BDCOE, Sevagram, Maharashtra, India*

Abstract - *A face detection and face recognition system is a biometric information processes, easy to use and working range is larger than others, i.e. eye retina, fingerprints, signature etc. The system uses a combination of techniques in two topics: face detection and recognition. The face detection is performed on live acquired images without any application field in mind. Processes utilized in the system are white balance correction, skin like region segmentation, facial feature extraction and face image extraction on a face candidate. Then a face classification method that uses python OpenCV library.*

Key Words: **Android, PyCharm, CV2 library, Visual Studio, Postman Office, Xampp**

1. INTRODUCTION

We will initially have a dataset of images that are to be compared. Using this dataset we will compare any random images taken from the phone's camera and then using OpenCV we will perform various image processing algorithms and identify the similarity between the images. Face recognition is an important part of the capability of human perception system and is a routine task for humans, while building a similar computational model of face recognition. There are many algorithms for face recognition have been reposed. Depending on the necessary information extracted from certain images, the algorithms can be divided into the holistic-features-based method[2], the local-features based method, and the hybrid method[3]. Such methods using holistic features such as Eigenface[4], Fisher face(4), Eigenfeature Regularization and Extraction (ERE)[7], and Discriminant Discrete Cosine Transform (D-DCT)[7][8] extract the necessary features from the whole image of a face using various linear transforms.

1.1 What Has Changed?

In previous years they had done In previous years they had done work on eigenface to eigenfeatures corresponding to face components, such as eyes, nose, and mouth. They used a modular eigenspace which was composed of the above eigenfeatures (i.e., eigen eyes, eigen nose, and eigen mouth). Recognition rate of 95 percent on the FERET database of 7,562 images of approximately 3,000 individuals. In summary, eigenface appears as a fast, simple, and practical method. However, in general, it does not provide invariance over changes in scale and lighting conditions.

Similarly, Face detection is a computer technology that determines the location and size of human face in arbitrary (digital) image. The facial features are detected and any other objects like trees, buildings and bodies etc. are ignored from the digital image. It can be regarded as a specific case of object-class detection, where the task is finding the location and sizes of all objects in an image that belong to a given class. The major human face recognition techniques that apply mostly to frontal faces, advantages and disadvantages of each method are also given. The methods considered are eigenfaces (Eigen features), neural networks, dynamic link architecture, hidden Markov model, geometrical feature matching, and template matching. The approaches are analyzed in terms of the facial presentations they used.

2. WHAT IS A FACE DETECTION AND FACE RECOGNITION?

2.1 Face Detection:

A Face detection is a computer technology being used in a variety of applications that identifies human faces in digital images.

2.2 Face Recognition:

A face recognition is a computer technology capable of identifying or verifying a person from a digital image or a video frame from a video source.

2.3 Abbreviations and Acronyms:

Abbreviation:

- Prof. – Professor
- Feb – February
- Jul – July
- Nov – November

Acronyms:

- IEEE – Institute of Electrical And Electronic Engineering
- OpenCV - Open Source Computer Vision

- Xampp - X means Cross Platform, Apache server, MySQL, Perl and PHP.

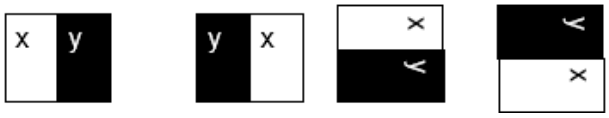
2.4 Equations:

Step1: Finding out shapes of face i.e. circle, oval and rectangle.

Step2: finding out edge features of face. Everyone's face's half portion is divided in to two portion i.e. dark portion and fair portion of the face.

let, x=dark_portion_of_face and y=fair_portion_of_face

face = x+y; or face = y+x;



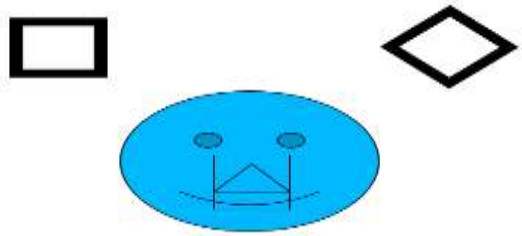
Step3: Finding out Line Feature. let x= dark_portion_of_face and y= fair_portion_of_face.

equation=y+x+y or x+y+x

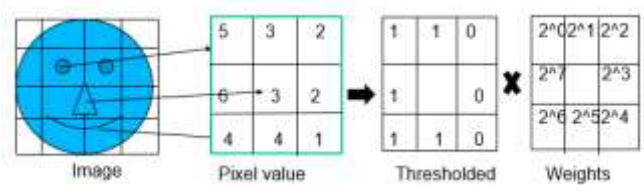
It is divided in to three level to finding out line features of face. It is a combination of (dark,fair,dark) or (fair,dark,fair) part of face.

Step4: Finding out Centre Surround Features. The centre surround features are finding out based on centre part of the face i.e. nose.

Consider the above image, which is finding out the centre surround features based on eyes, nose and lips.



Step5: Converted RGB or BGR image into gray scale image and finding out its LPB on the basis of pixel values.



Set->RGB/BGR_image:=grayscaleimage

Set->Pixelvalue(grayscaleimage)

If Pixelvalue(grayscaleimage)>Pixelvalue(

grayscaleimage(2^8)) then

Set->ThresholdedValue:=1;

else

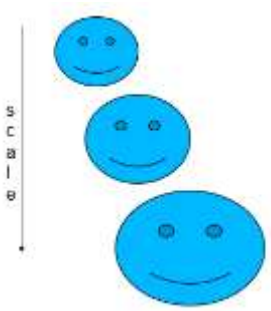
Set->ThresholdedValue:=0;

LBP=2^0+2^1+2^7+2^6+2^5

LBP=277

Step7: Set->image*200;

In this stage we convert image into large scale or expand the image size. This image size is incremented by 2 at each time. This stage is performed because some of the it is very complicated to finding out face from group photo.



Step8: Match the images with the database images.

Step7: Stop.

2.5 Some Common Mistakes:

- Not being able to retrieve a face after adding it to a face list This issue makes it difficult to find mistakes in the system, such as a ID being linked to the wrong face, which can greatly reduce efficiency and accuracy, especially in an environment where such a system would be used on a great number of students on a daily basis. It would be impossible to know when a mistake has been made without being able to check if a ID matches the right face and therefore a solution is essential for the system to be used appropriately.
- It unable to check skin color while it checked skin of face.
- In the recognition process application works properly on mac system but not support on windows system due to hardware requirement.

3. IMPLEMENTED WORK

Fig -1: Homepage

Fig -2: Image Selected Window for Face Detection

Fig -3: Detected Faces from the Image

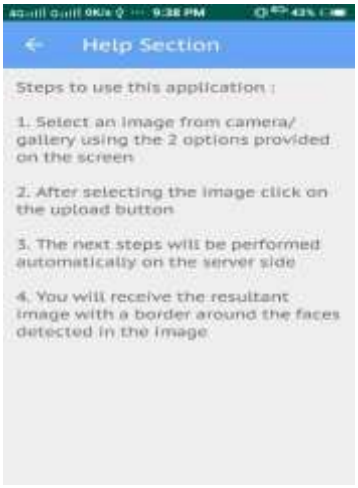


Fig -4: Help Section

4. ARCHITECTURE

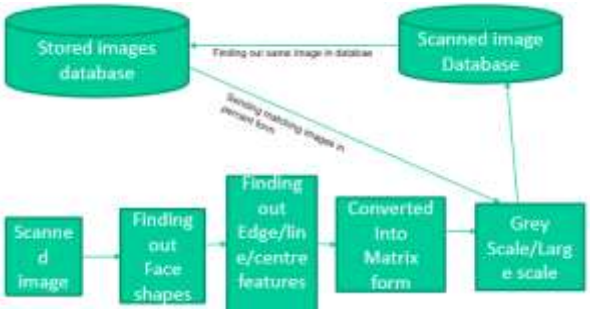


Fig -5: Architecture of Face Detection and Face Recognition System

5. CONCLUSION

Face recognition technology has come a long way in the last twenty years. Today, machines are able to automatically verify identity information for secure transactions, for surveillance and security tasks, and for access control to buildings etc. These applications usually work in controlled environments and recognition algorithms can take advantage of the environmental constraints to obtain high recognition accuracy. However, next generation face recognition systems are going to have widespread application in smart environments where computers and machines are more like helpful assistants. To achieve this goal computers must be able to reliably identify nearby people in a manner that fits naturally within the pattern of normal human interactions. They must not require special interactions and must conform to human intuitions about when recognition is likely. This implies that future smart environments should use the same modalities as humans, and have approximately the same limitations. These goals now appear in reach however, substantial research remains to be done in making person recognition technology work reliably, in widely varying conditions using information from single or multiple modalities.

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