

# Face Retrieval Based on LBP

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**Abstract:** Now-a-days we find enormous number of photos in our daily life, most photos are digital images where we frequently find in the social Network (like facebook.) and those images are with human faces. Retrieving an face image from these large set of data is the biggest problem we are facing today. In this work, The aim is to address this problem which is to retrieve a face image from the database We propose 3 Orthogonal methods for the face image retrieval from the Real – database system. The Viola – Jones technique is used for Face detection. The basic LBP pattern was applied to the facial landmarks and the LBP histogram is developed to the features. And finally by finding the Histogram distance for the images, the minimum nearest value image will be required image to be retrieved. The ranked result image retrieval system possess almost 45% of accuracy.

**Keywords:** Image Retrieval, Face detection, Viola – Jones technique, Local Binary Pattern.

## 1 INTRODUCTION

In order to retrieve the face image from the large collection of database, firstly we need to identify the face in an image, after detecting the face we need to extract the features and we use LBP method to all the features extracted and generate the histogram patterns and by matching the patterns we can filter the images and then finally by calculating the distance formula minimum nearest value will be ranked in highest prior and that will be required image.

Given a query image, to retrieve the similar image from the large collection of data set, initial step is to detect the face in an image, Face detection is main task to find the position and size of objects in an image. Face detection algorithms [1] are mainly focused in the detection of frontal human face detection. However, face detection is a still a very toughest problem due to the high features like shape, color of human faces. To detect the face we use an technique VIOLA-JONES TECHNIQUE [2] – to find the required regions on the image (corners of eyes, nose, mouth), it extract the features from the image.

After detecting the face in an image we use Local Binary Pattern(LBP)[5] method to all the detected features and Histogram[7] is been calculated to all the patterns and By comparing the patterns and obtaining the concatenated histogram pattern of both dataset and the trained data, which is been evaluated with the nearest pattern by finding the Euclidean distance of the histogram that nearest value now by matching the patterns we can sort out the images and then finally by calculating the distance formula[8] to those histograms we can find the nearest value accordingly and all those order wise are the required ranked images to the given query image.

## 2 RELATED WORKS

### 2.1 Viola-Jones Technique

It is the first object detection framework to provide object detection in real time proposed in 2001 by Paul Viola and Michael Jones.

Paul Viola and Michael Jones[2] worked on the concept of Real-Time face detection for the first time by promising the result to the computer vision world. In this paper they introduce three methods in order to detect the efficient face – Integral Image, Adaboost learning algorithm and the cascaded classifiers in order to detect the faces in an image.

The proposed methods of the Viola-Jones technique for face detection minimizes the Manipulating time by achieving the better accuracy in detection. They specify that the accuracy in the system is approximately 15 times much more faster than the any other techniques to detect.

The first technique which introduced a new technique – Integral Image by calculating the set of images features, The newly introduced second technique – the AdaBoost learning algorithm which boost the performance of the learning algorithm, The third technique is used to develop the classifiers which reduces computing time which improves the detection accuracy.

Advantages of Viola – Jones algorithm

- ✕ Feature Computation is Extremely fast
- ✕ Efficient feature selection
- ✕ Scale and location invariant detector
- ✕ Instead of scaling the image itself (e.g. pyramid filters), we scale the features.

Such a generic detection scheme can be trained for detection of other types of objects (e.g. cars, hands)

Disadvantages of Viola–Jones algorithm

- ✘ Detector is most effective only on frontal images of faces
- ✘ Sensitive to lighting conditions
- ✘ We might get multiple detections of the same face, due to overlapping sub-windows.

The problem is to implement an algorithm to detect the face in an image. Usually This can be solved easily by the humans But the task is difficult by the computer vision .In order to ease this task viola-Jones [2] devised an algorithm, called Haar Classifiers[3], to rapidly detect human faces, using AdaBoost classifier[4] cascades that are based on Haar-like features.

2.2 LBP Features

The Local Binary Pattern operator[7] is a non-parametric 3x3 kernel which reviews the local special feature of an image. It was firstly introduced by Ojala et al[6]. , who promisingly demonstrated the high discriminative power of the operator for texture classification and at a given pixel location. LBP is described as an ordered set of binary comparisons of pixel intensities between the centre pixel and its 8-neighborhood pixels.

The LBP is basically classified into two different descriptors: a global and a local. The global is used to discriminate the most non-face objects, whereas the second descriptors provides particular about face information which is usually not only used to select faces, but also to provide face information for recognition of the image.

The original LBP feature names the pixels of an image of 3X3 neighbourhood of each pixel with the centre pixel value and it considers the result obtained as a binary number.

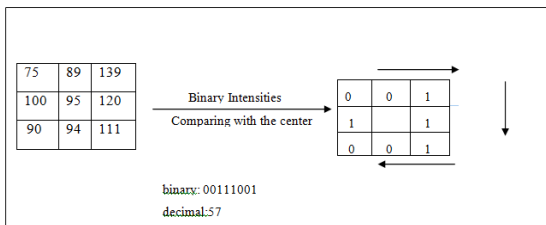


Fig1. Basic LBP

2.3 Histogram Distance:

After developing the histograms to relevant facial features it calculates the distance [8] between them and sorts the results by the minimum nearest histogram and displays the retrieved image.

The distance between sets D(A,B) and the distance between their histograms D(H(A),H(B)).

$$D(A,B) = D(H(A),H(B)).$$

A histogram is treated as a dimensional vector, and hence the standard vector norms can be used as distances between two histograms as follows:

*Euclidean (L<sub>2</sub>-norm):*

$$D_2(A,B) = \sqrt{\sum_{i=0}^{b-1} (H_i(A) - H_i(B))^2}.$$

3 PROPOSED SYSTEM

We propose 3 orthogonal steps for the retrieval of the face image from the large collection of the system, Initially the task is Face Detection[1]-As discussed above, Viola- Jones technique[2] detects the face in an image which is the first step for retrieving, Next step is to apply the LBP pattern matching[7] to all features extracted, Later Histogram[8] is designed to all the features.

The proposed methods are worked as below fig 2 manner, after the face is been extracted from the queried image the processing step is to match the required pattern with other existing patterns in the dataset. By comparing the patterns and obtaining the concatenated histogram pattern of both dataset and the trained data, which is been evaluated with the nearest pattern by finding the Euclidean distance[8] of the histogram that nearest value will be the prior, then that is retrieved in the ranked array list.

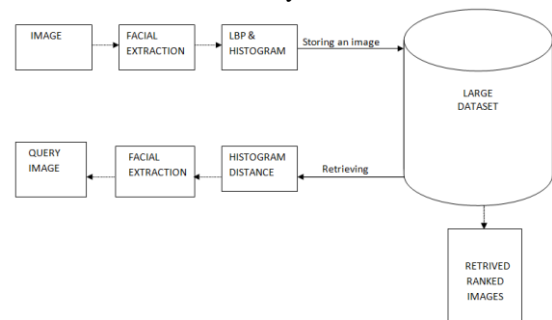


Fig.2 Face Detection based on LBP

4. EXPERIMENTAL RESULTS

As we discussed above in order to retrieve the face image we need to confirm the face is present in the image and we are using the Real- time database, from this database we are retrieving the image.

The Fig3 window represents about uploading the image to the trained data set. By tagging its human attributes like gender, hair color and skin color. Before uploading the image LBP method is applied to the facial image – It initially detects the face from the image that is in order to extract the face, it should detect the Eyes, Nose and mouth from the image if the facial landmarks are found in an image then the face is been detected in the image. LBP is developed to the facial landmarks and finally concatenated LBP pattern to the face detected.

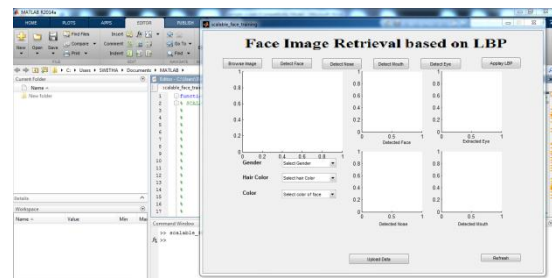
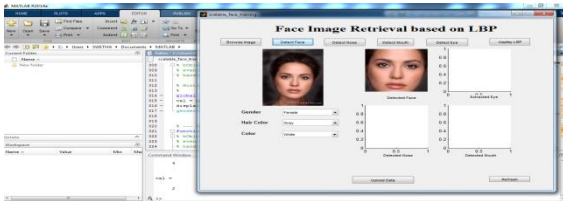


Fig 3 Uploading the image

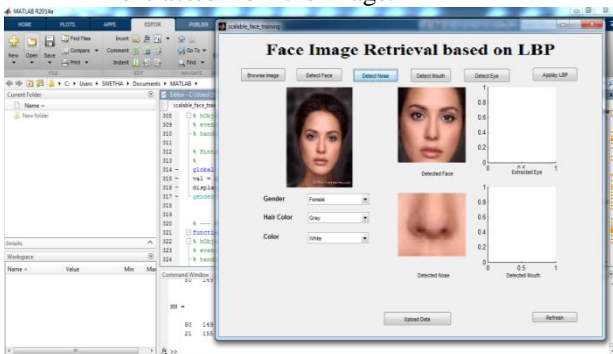
## FACE DETECTION

The Fig.5 window as shown below represents the detected face, which is initial step to retrieve an image from the real – database



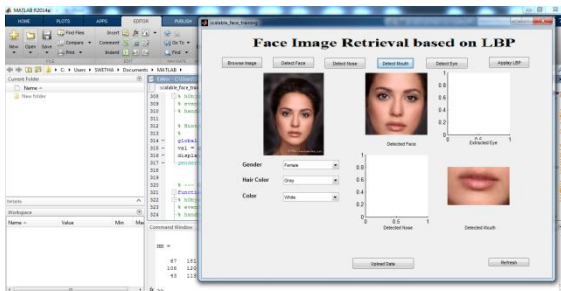
**Fig5: Detected Face from the image**

✘ The fig 7 window as shown below represents the detected nose from the face which is been extracted from the image.



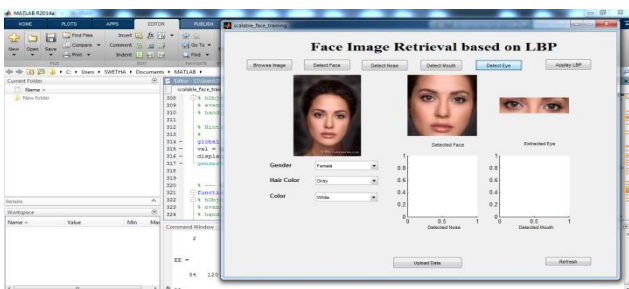
**Fig7: Detected Nose**

✘ The fig4 window as shown below represents the detected Mouth from the face which is been extracted from the image.



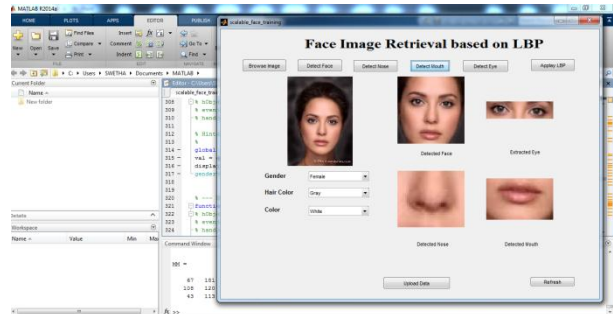
**Fig 4 Detected Mouth**

✘ The fig6 window as shown below represents the detected Eyes from the face which is been extracted from the image.

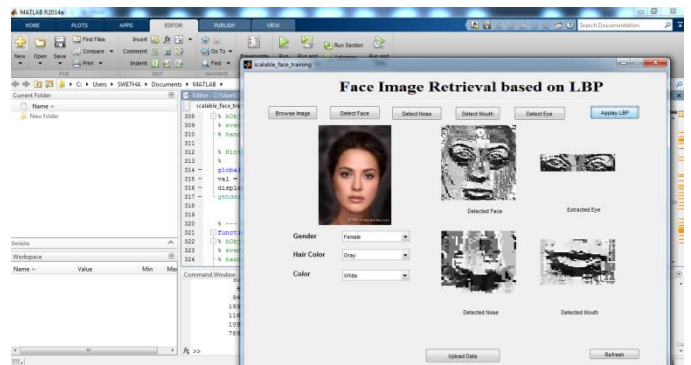


**Fig6: Detected Eyes**

The Fig8 window shown below represent the face image extracted from the image and repective facial landmarks.

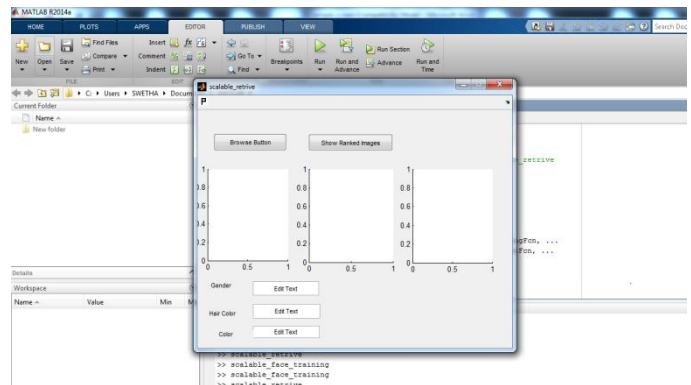


**Fig8: Extraction of face and facial landmarks**



**Fig 9 Applied LBP pattern for detected landmarks**

## FACE RETRIEVAL:



## CONCLUSION

We propose 3 Orthogonal methods for the face image retrieval from the Real – database system. The Viola – Jones technique is used to detect the face in an image. The basic LBP pattern was applied to the facial landmarks and the LBP histogram is developed to the features and is concatenated. And finally the Histogram distance is calculated for the images and the minimum nearest value image will be displayed as the first similar images follows the 2<sup>nd</sup> nearest prior image. The ranked result image retrieval system possess almost 45% of

accuracy in retrieving the result image. In a worst case if the face image is even available in the database, while retrieving the image it may not be retrieved due to its appearance in an image, Histogram distance value may vary with this image appearance and display the other similar image in the ranked result.

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