

# Recognition of Face Features from Sketch and Optical Faces

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**Abstract:** *Forensic Sketch to digital face matching is an important research challenge and is very pertinent to law enforcement agencies. As a special forensic art, face sketching is traditionally done manually by police sketch artists. As a result of rapid advancements in computer graphics, realistic animations, human computer interaction, visualization, and face biometrics, sophisticated facial composite software tools have been developed and utilized in law enforcement agencies. Face sketching is a forensic technique that has been routinely used in criminal investigations. Forensic sketches are drawn based on the recollection of an eyewitness person and the expertise of a sketch artist. Because face sketches represent the original faces in a very concise yet recognizable form, they play an important role in criminal investigations, human visual perception, and face bio-metrics. This paper presents an efficient technique called Cascade object detection with viola jones technique for face detection, also features of face is being extracted by using Extended uniform circular linear binary pattern method.*

**Keywords:** Face detection, feature extraction, optical face, sketches.

## 1. Introduction

Face detection and recognition technology has been widely discussed in relation to computer vision and pattern recognition. Numerous different techniques have been developed owing to the growing number of real world applications. For service robot, face detection and recognition are extremely important, in which the emphasis must be put on security, real-time, high ratio of detection and recognition. Also it plays an important role in a wide range of applications, such as mug-shot database matching, credit card verification, security system, and scene surveillance. However, matching sketches with digital face images is a very important law enforcement application that has received relatively less attention. Forensic sketches are drawn based on the recollection of an eyewitness and the expertise of a sketch artist.

One of the important cues in solving crimes and apprehending criminals is matching sketches with digital face images. Generally, forensic sketches are manually matched with the database comprising digital face images of known individuals. The state-of-art face recognition algorithms cannot be used directly and require additional processing to address the non-linear variations present in sketches and digital face images.

An important application of face recognition is to assist law enforcement. Automatic retrieval of photos of suspects from the police mug shot database can help the police narrow down potential suspects quickly. However, in most cases, the photo image of a suspect is not available. The best substitute is often a sketch drawing based on the recollection of an eyewitness. Therefore, automatically searching through a photo database using a sketch drawing becomes important. It can not only help police locate a group of potential suspects,

but also help the witness and the artist modify the sketch drawing of the suspect interactively based on similar photos retrieved. However, due to the great difference between sketches and photos and the unknown psychological mechanism of sketch generation, face sketch recognition is much harder than normal face recognition based on photo images. It is difficult to match photos and sketches in two different modalities. One way to solve this problem is to first transform face photos into sketch drawings and then match a query sketch with the synthesized sketches in the same modality, or first transform a query sketch into a photo image and then match the synthesized photo with real photos in the gallery. Face sketch/photo synthesis not only helps face sketch recognition, but also has many other useful applications for digital entertainment.

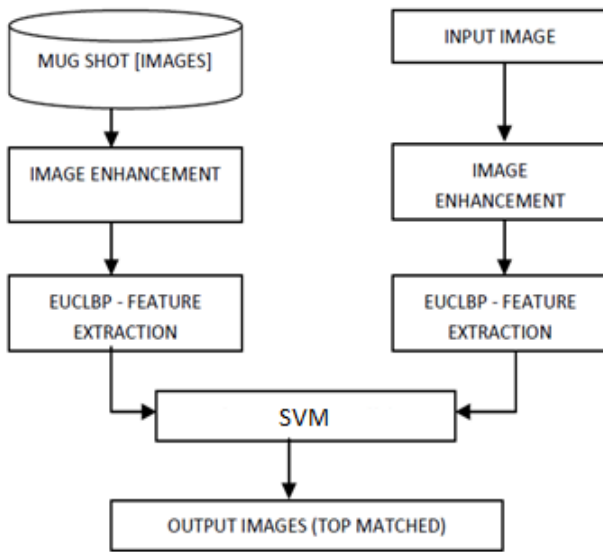
Artists have a fascinating ability to capture the most distinctive characteristics of human faces and depict them on sketches. Although sketches are very different from photos in style and appearance, we often can easily recognize a person from his sketch. How to synthesize face sketches from photos by a computer is an interesting problem. The psychological mechanism of sketch generation is difficult to be expressed precisely by rules or grammar. The difference between sketches and photos mainly exists in two aspects: texture and shape.

## 2. Design Methodology

‘Hand drawn face sketch recognition in Forensic application’ shall be implementing in future. Following are the Steps involved in process of matching sketches with digital face images are:

1. First we are going to generate a database simultaneously for both sketches and digital face.

2. The preprocessing technique is used to enhance the quality of both the digital face images and sketch images.
3. Feature Extractions.
4. Then the SVM method is used for recognition.
5. Finally we get the matched output images.



**Figure 1:** Architecture Diagram

Proposed Methodology will provide:

- 1) To improve recognition rate
- 2) To improve accuracy
- 3) To provide more efficiency

### 3. Face Detection

There are many techniques available for Face detection. For real time face detection a technique called Cascade object detection with Viola Jones technique can also use for face detection. For real-time face detection, typically, in 1997, P. Viola presented a machine learning approach based on Adaboost and Cascade technique, which is capable of detecting faces in images in real-time.

#### 3.1 Facial Database

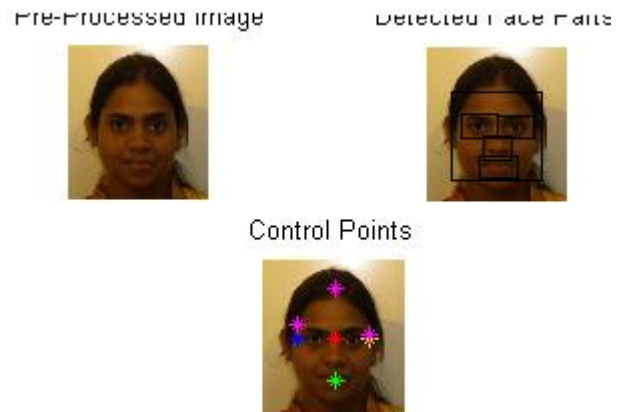


**Figure 2:** Shows example images used for experiments

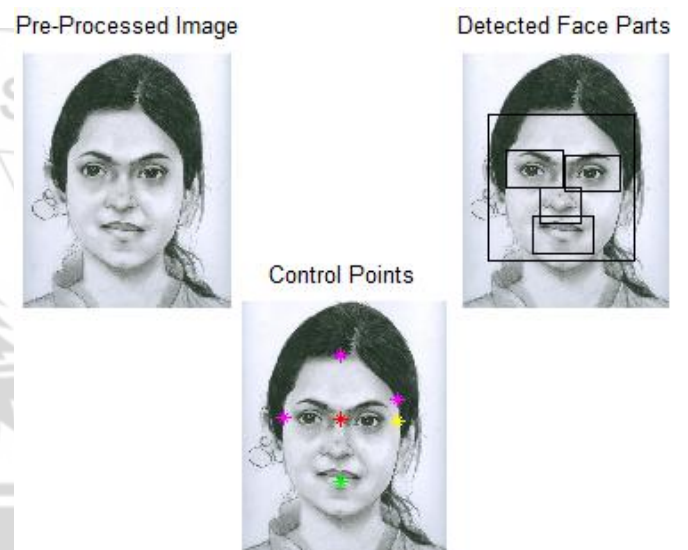
#### 3.2 Face Detection

In face detection the elements which we are detecting are Face, Left eye, Right eye, Nose and Mouth along with control point of these Elements.

### 3.3 Result of face detection



**Figure 3:** The Result of face detection of sketch along with control points



**Figure 4:** The Result of face detection of sketch along with control points.

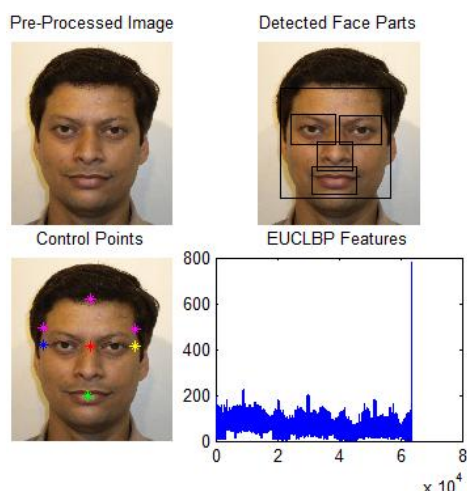
### 4. Features Extraction

Feature Extraction involves reducing the amount of resources required to describe to a large set of data. In image processing, feature extraction starts from an initial set of measured data and builds derived values. Feature extraction is related to dimensionality reduction.

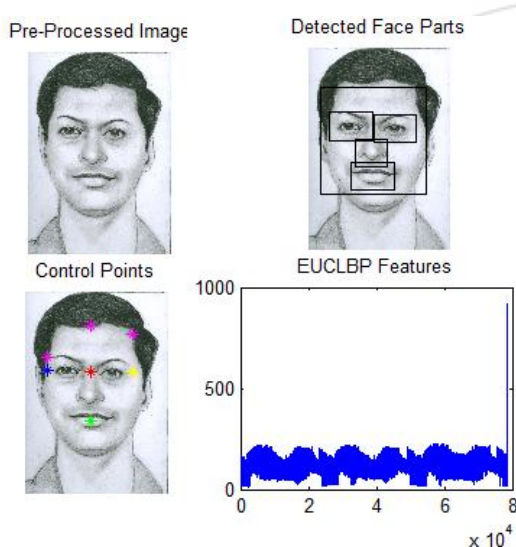
#### 4.1 Method of Features Extraction

EUCLBP method is used for Feature Extraction. EUCLBP stands for Extended Uniform Circular Local Binary Pattern. Local Binary Pattern (LBP) is a simple yet very efficient texture operator which labels the pixels of an image by thresholding the neighborhood of each pixel and considers the result as a binary number. The most important property of the LBP operator in real-world applications is its robustness to monotonic gray-scale.

## 4.2 Result of Features Extraction



**Figure5.** : The Result of feature extraction of face



**Figure6.** : The Result of feature extraction of face sketch

## 5. Conclusion

This paper presents face detection and feature extraction process. The method starts with the preprocessing technique to enhance sketches and digital images. However, in the proposed work SVM method will be used for the face sketch recognition, which will provide more efficiency, good accuracy and high recognition rate. In this paper we use Cascade object detection with viola jones techniques for face detection and EUCLBP which stands for extended uniform circular linear binary pattern technique is used for feature extraction. The elements which we are detecting are Face, Left eye, Right eye, Nose and Mouth along with control point of these Elements. Also Features is being calculated in result.

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