



## Third Eye: Forensic Face Sketch and Fingerprint Recognition

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**Abstract.** In Forensic science, Face sketches are time consuming and are very limited to identify subjects. In this paper, we will present an interface which will allow users to create a face sketch of the suspects or they can insert and verify their hand drawn forensic face sketch. After the construction of face sketch, it can automatically match with the faces in the database. Fingerprint of suspects is also verified in database. By using the face and fingerprint recognition we can retrieve the details of the suspects from aadhaar database. We can easily identify the suspect with the help of the aadhaar details from aadhaar database. Biometric Recognition is necessary for safety and security.

**Keywords:** Forensic Sketch, Face Sketch Construction, Face Recognition, Criminal identification

### 1. Introduction

Forensic Face Sketch Recognition is an essential complication when the suspect's image is not available or the photo of the suspect is not in a good standard. The description given by the victim can be used to produce the face sketch in software or by forensic artist. A lot of important measures on the one hand, can be taken by the government in order to reduce the crimes. This conventional method of construction of face sketch is not found to be efficient but, forensic face sketches play an essential role in the suspect recognition process. Hence, The constructed Face sketch using the given description of the eyewitness is the only sign to recognize the suspect so, a computerized matching mechanism is needed to search and find the suspect in the law enforcement database. Many people have been studying facial sketch recognition in recent years. Semi-forensic sketches, hand-drawn sketches, and composite sketches are examples of existing sketches. These sketches have minimal information and missing details such as backdrop, colour, and so on. Face sketch recognition difficulties mostly focus on the matching mechanism of sketch which is dependable. For face sketch recognition, many researchers used deep learning in recent times. It is very difficult to learn the robust characteristics because there will be one sketch for a person in many of the available datasets. It is better to use facial features in sketch, it will be more superior because the color of eyes, hair, nose, ears if added it will be more advantageous. An approach which divided the domain into two parts by gender to rearrange the rank list of criminals.

### 2. Literature Review

In [1] authors presented an algorithm named as AdaBoost algorithm which detects the face by creating the geometrical model of the face. They use multi-scale local binary patterns (MLBP) to remove the individual features from each part of the face and to recognize each person uniquely, they trained a ANN classifier. In [2] they used a method named as deep learning, which is to extract the unique features from the models. Researchers found that they can easily classify by using this deep learning techniques. They designed the recognition system using classification models. In [3] They used EvoFIT to construct the face recognition using composites. It automatically forms and spots the facial composites. They essentially focused on pixel intensity which is beneficial for composite sketches formed which is based on a old feature – based system. In [7] an approach which is used to train relevant descriptors and it includes conventional recognition of face. In numerous domain it had proven as success for recognition of the face. Inter-modality face recognition is not evolved. It recognizes the facial features automatically in photos and face sketches but, they were not flawless.

In [8] They use multi-scale local binary patterns (MLBP) to remove the individual features from each part of the face and to recognize each person uniquely. It recognizes the facial features with the photos and composite sketches using Active Shape Model (ASM). The matching mechanism is improved by filtering the photos of face

### 3. Methodology

**Image Dataset:** An Image Dataset is an collection of specific images that programmers use to train, test and evaluate the performance of the algorithms. A dataset is an collection of related images that are named and it can be used as an reference for the specified objects.

**Image Sketch:** A sketch is a drawing which is considered to illustrate the facial features of the suspect or the model whom the witness will describe. It is drawn rapidly, by using the facial features. This sketch may evident things with the help of the description provided by the eyewitness. This sketch can be developed for future use. The image sketch graphically represents

the suspect. The face contains facial parts like eye, nose, ear, chin, hair, etc. Essential wearable things were included in the system. A sketch can be constructed or a drawn sketch can be uploaded to the system for verification with the database

**Image Reconstruction:** In this application, accurate face sketch can be created using the defined facial feature collection provided as implementations which allows the user to change the size and we can change the position according to the description given by the eye-witness. The CNN Algorithm will grasp and it will make an effort to recommend the facial feature and it will help to achieve the complete face sketch construction much better. It is very much efficient by suggesting the hints. The algorithm gives more accuracy.

**Image Recognition:** Image recognition, is the propensity of system to recognize the faces, fingerprints, things, humans in photos Systems can utilize the machine vision computing with machine learning software and other tools to accomplish the image recognition.

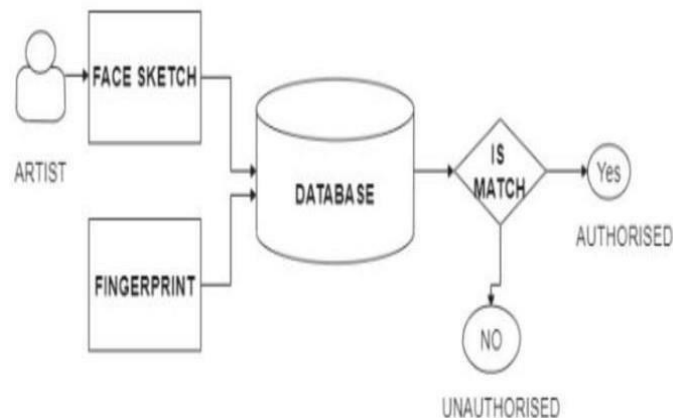
#### 4. Proposed System

The proposed system uses transfer learning for recognition of face sketches with the images and fingerprint recognition. The system is well trained for the face sketch recognition and fingerprint recognition. To develop the performance, a numerous sketches were used in the testing phase. A model can be used to process new images, which expands the dataset to avoid over- fitting. In this paper, the system is an graphical user interface ,which would have three options face sketch ,fingerprint ,face. If we click on face ,then the hand drawn sketch or any other sketch can be uploaded in the system and it can be verified with the photos available in the aadhaar database .if any match found, then it will return the image with the matched image, name and details. If we select the finger print on the system, t hen a range of options to select from based on the details, the fingerprint of the suspect can be verified with the fingerprints in the aadhaar database. if there is a match then all the details about that will be identified. if we click on the sketch ,then we can able to create an sketch in our recognition system. we have options to choose eye, nose, lips, chin, ears, hair, etc. we can construct the sketch by getting the description from the eyewitness about the suspect face. we can add the facial features. we can modify it by using drag and drop option. Any user in the law enforcement department can construct the face sketch efficiently. We can create the sketch by drag and drop options. we can drag the facial parts and construct the sketch .After the face sketch construction, the face sketch can be verified with the faces in the aadhaar database. if the sketch matches with the image then, the result is displayed as matched with the respective details

##### Advantages of Proposed System

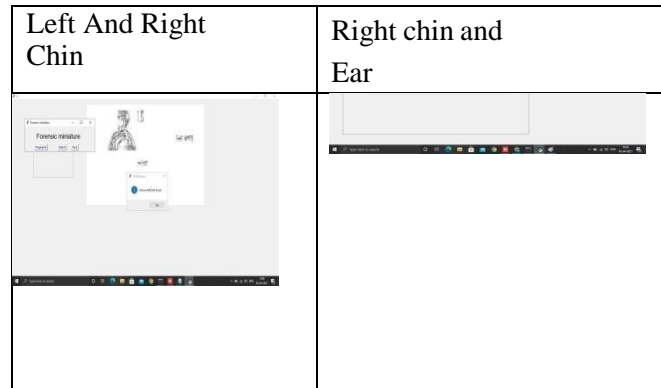
- The proposed system reduces the corruption.
- It is user friendly and it provides access to the authorized person i.e., government only
- When compared to existing approaches, the suggested system is proven to reduce sketch identification error rates.

##### System Architecture



#### 5. Results

The proposed system is developed using Python. By efficiently constructing the face sketch without the help of forensic artists and automatically matching them with the law enforcement database .Additionally ,fingerprint of suspects is also recognized in the law enforcement.



## 6. Conclusions

In real-world applications, "Third eye : Forensic Face sketch and fingerprint Recognition" was conceived and developed for face sketch and fingerprint identification. As a result, in this research, we present a graphical user interface (GUI) for face reconstruction and fingerprint matching. This interface is used by the law enforcement department to recognise facial sketches.. We allow users to create the face sketch using drag and drop feature. It can automatically match the image efficiently.

**Future Enhancements:** We will enhance our platform by exploring various media. We will try to match the face sketches with the people in the videos like CCTV footages. We can use imaging and 3D mapping techniques to perform the face recognition to the CCTV surveillances. We will also try to use this matching algorithms on the live CCTV footages

## References

- [1]. Shivaleela Patil, Dr.Shibhangi D C "Composite Sketch Based Face Recognition Using ANN Classification" January 2020 International journal of Scientific And Technology.
- [2]. Sukhada Chokkadi , Sannidhan, Sudeepa , Abhir Bhandary "A Study on various state of the art face recognition system using deep learning techniques" July- August 2019 International Journal of Advanced Trends in Computer Science and Engineering.
- [3]. W. Zhang, X. Wang and X. Tang "Coupled information theoretic encoding for face photo- H. Han, B. Klare, K. Bonnen, and Jain "Matching composite sketches to face photos: A component based approach" 21 November 2012 Information Forensics and Security.
- [4]. Charlie Frowd, Anna Petkovic, Kamran Nawaz and Yasmeen Bashir "Automating the Processes Involved in Facial Composite Production and Identification" 22 August 2011 CVPR .
- [5]. P. Yuen and C. Man "Human face image searching system using sketches" 18 June 2007 IEEE Transactions on Systems, Man, and Cybernetics .