



A NOVEL FACE IDENTIFICATION FRAME WORK

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ABSTRACT

Criminal record generally contains personal information about particular person along with photograph. To identify any criminal we need some identification regarding person, which are given by eyewitnesses. In most cases the quality and resolution of the recorded image-segments is poor and hard to identify a face. To overcome this sort of problem we are developing software. Identification can be done in many ways like fingerprint, eyes, DNA etc. One of the applications is face identification. The face is our primary focus of attention in social inter course playing a major role in conveying identity and emotion. Although the ability to infer intelligence or character from facial appearance is suspect, the human ability to recognize faces is remarkable. The operator first logs into the system by entering username and password. Then depending on the work allotted he has to select the screens from main menu screen. There are mainly three important function which he can do they are adding details, clipping image and finally construction of the face by using the eyewitness. The face that is finally formed is one the who has done the crime.

Keywords: face identification, crime, frame work, novel.

1. INTRODUCTION

Face Identification [1, 2, 3] is a technique that is mainly used to identify criminals based on the clues given by the eyewitnesses. Based on the clues we develop an image by using the image that we have in our database and then we compare it with the images already we have. To identify any criminals we must have a record that generally contains name, age, location, previous crime, gender, photo, etc.

The primary task at hand is, given still or video images require the identification of the one or more segmented and extracted from the scene, where upon it can be identified and matched. The word "image is defined as" an exact or analogous representation of a being or thing." The image or monochrome image [4] such as black and white paragraph is represented as two-dimensional light intensity function $f(x, y)$ where x and y denotes spatial co-ordinates. A digital image is an image of $f(x, y)$ that has been digitized both in spatial co-ordinate and brightness. The elements of such a digital array are called image elements, picture elements and pixels or pels.

This system is aimed to identify the criminals [5] in any investigation department. Here the technique is we already store some images of the criminals in our database along with his details and that images are segmented into many slices say eyes, hairs, lips, nose, etc. These images are again stored in another database record so to identify any criminals; eyewitnesses will see the images or slices that appear on the screen by using it we develop the face, which may or may not be matched with our images. If any image is matched up to 99% then we predict that he is only the criminal. Thus using this system it provides a very friendly environment for both operator and eyewitness to easily design any face can identify criminals very easy. This system is intended to identify a person using the images previously taken. The identification will

be done according the previous images of different persons.

1.1. Existing system

The development of face identification has been past from the year to years. In recent years to identify any criminal face they used to make a sketch or draw a image based on the eyewitnesses. It used to take more amount of time and it was very difficult task for any investigation department to easily catch the criminals within a stipulated time. In order to catch the criminals first they used to search their record whether to find out is there any record about that particular person in the past. In olden days each and every record was maintained in the books or registers or files which used to contain information about previous criminals with their names, alias name, gender, age, crime involved, etc. Here each and every task used to take the help of the person because they used to write in them and it needed very much of manual effort.

There are three major research groups, which propose three different approaches to the face recognition problem. The largest group has dealt with facial characteristics. The second group performs human face identification based on feature vectors extracted from profile silhouettes. The third group uses feature vectors extracted from a frontal view of the face. The first method is based on the information theory concepts in other words on the principal component analysis methods. In this approach, the most relevant information that best describes a face is derived from the entire face image. The second method is based on extracting feature vectors from the basic parts of a face such as eyes, nose, mouth and chin.



Drawbacks in existing system

- Need of extra manual effort.
- It used to take much time to find any criminals
- Not very much accurate.
- Danger of losing the files in some cases.
- Need Good Knowledge in drawing.

2. SYSTEM DESIGN

To overcome the drawbacks that were in the existing system we develop a system that will be very useful for any investigation department. Here the program keeps track of the record number of each slice during the construction of identifiable human face and calculate maximum number of slices of the similar record number. Based on this record number the program retrieves the personal record of the suspect (whose slice constituted the major parts of the constructed human face) on exercising the “locate” option.

Advantages of proposed system

- Very fast and accurate.
- No need of any extra manual effort.
- No fever of data loss.
- Just need a little knowledge to operate the system.
- Doesn't require any extra hardware device.
- At last very easy to find the criminals.

The present system consists of FIVE main components, they are Add criminal details, Clip criminal Image, Update criminal details, Construct criminal Image and Identification of the criminal. This process is shown in Figure-1(a). Fig 1(a) further comprises of Figure-2 that shows the Add criminal details process, Figure-3 that shows the Clip criminal image process, Figure-4 that show the Update criminal details process, Figure-5 that shows the construct criminal image process, Figure-6 that shows the criminal identification process.

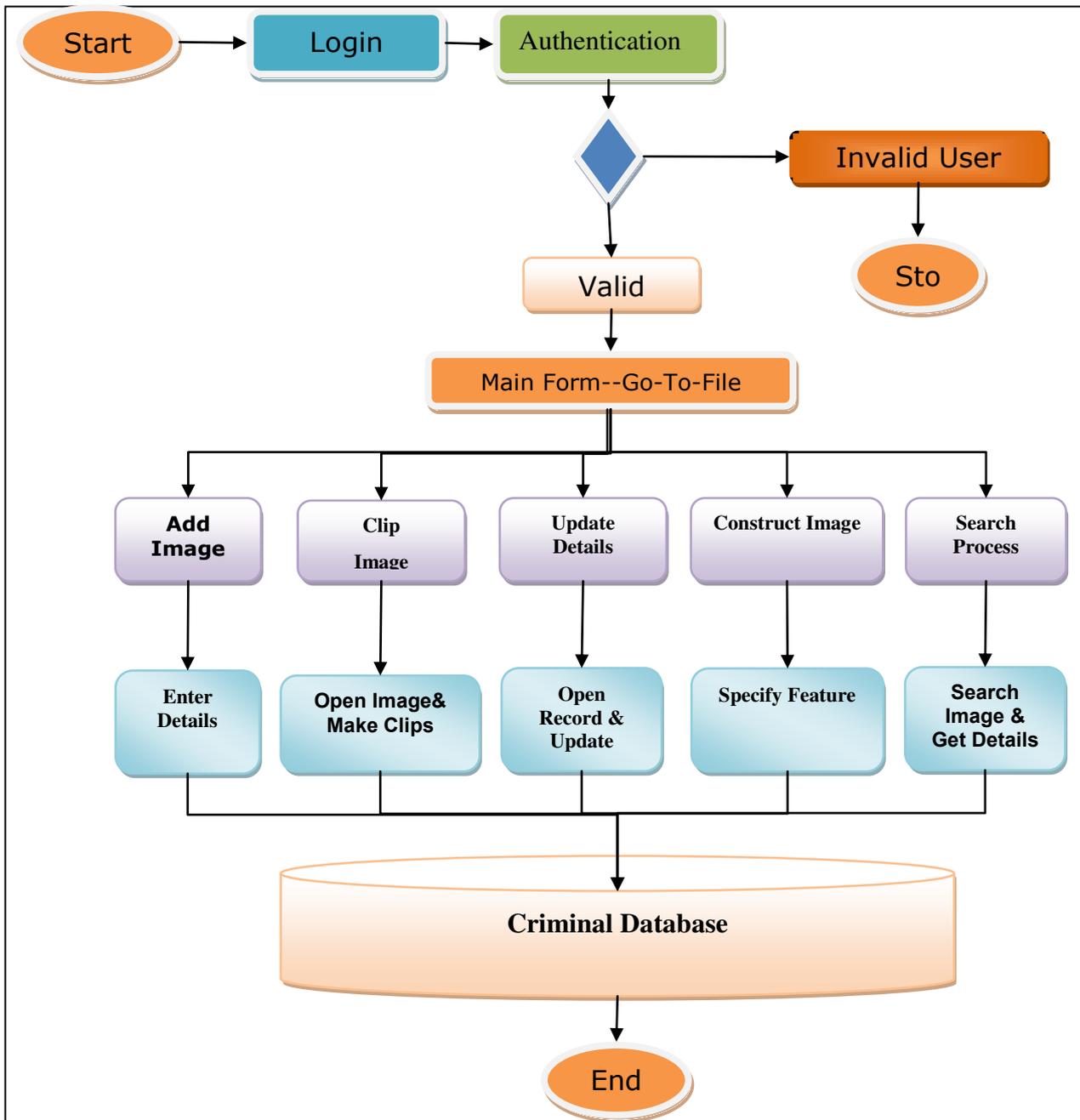


Figure-1(a). Whole process of the system.

In the Figure-1(b) the main task is to identify a criminal face. So, the operator and eyewitness are the inputs to our system and criminal face is desired output. Login process is shown in Figure-1(c). The inputs to the process are User Id and Password given by the developer

to allow the software available for the user environment. After giving the inputs the code checks whether the entered ones are valid are not. It displays screen if match occurs otherwise error message if they are not matched.

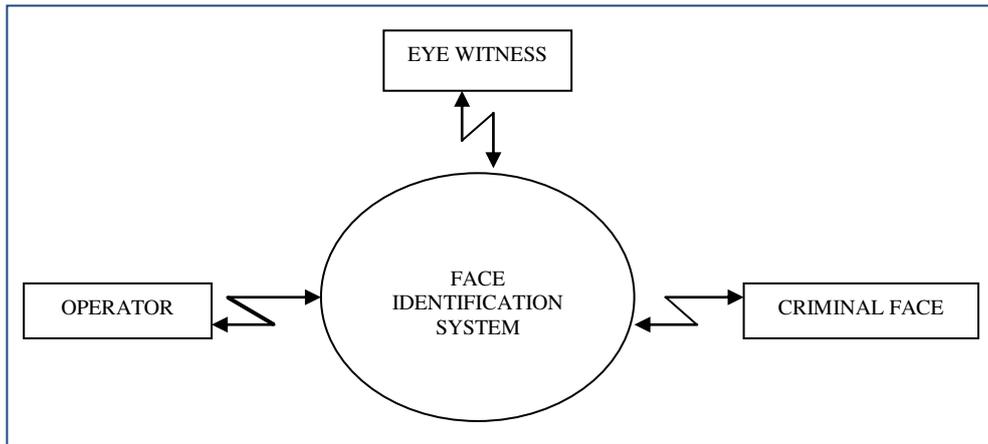


Figure-1(b). Face identification system.

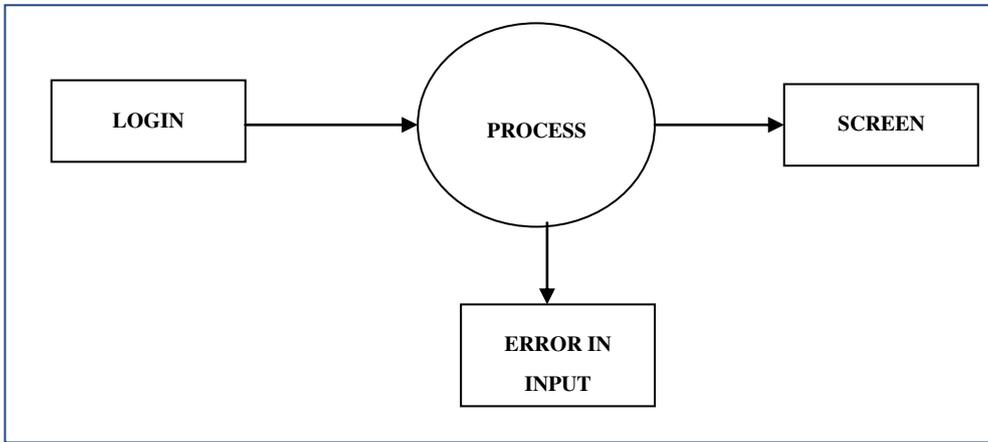


Figure-1(c). Login process.

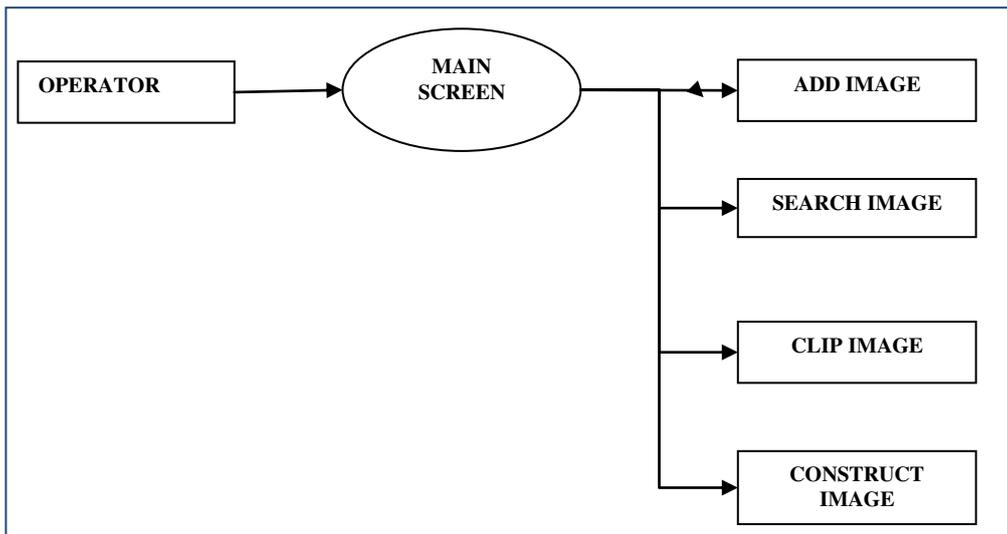


Figure-1(d). Main screen process.

The main screen process is shown in Figure-1(d). This process mainly explains the different screens that are available for the operator. Here the selection of the screen depends on the operator and he can select whatever screen

he wants. The different screens that are available are Add Image, Show or Search Image, Clip Image and Construct Image.

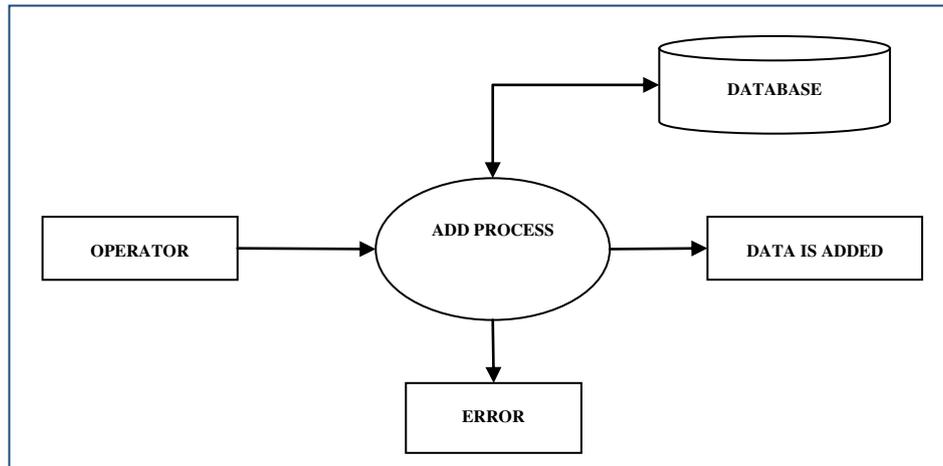


Figure-2. Add image process.

Figure-2 shows the add image process. This process clearly illustrates adding the details of the criminal such as name, alias name, age, gender, location, address, state and city along with his photo. These details are being

added to the database, if any error is generated then it will be prompted to the operator otherwise we get message data is successfully added.

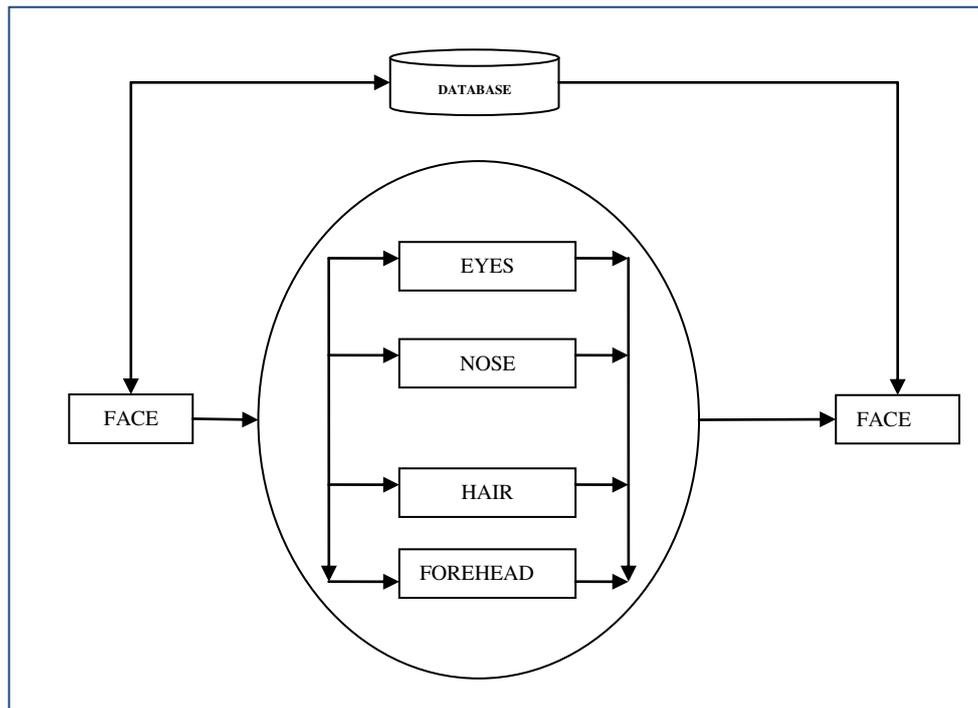


Figure-3. Clipping image process.

Figure-3 shows the clipping image process. This is used for clipping the image into different slices say eyes, forehead, lips, hair and nose. The input for this is

face which is divided into some slices which are stored in the database. Even though the image is divided into slices, the original image remains as it is.

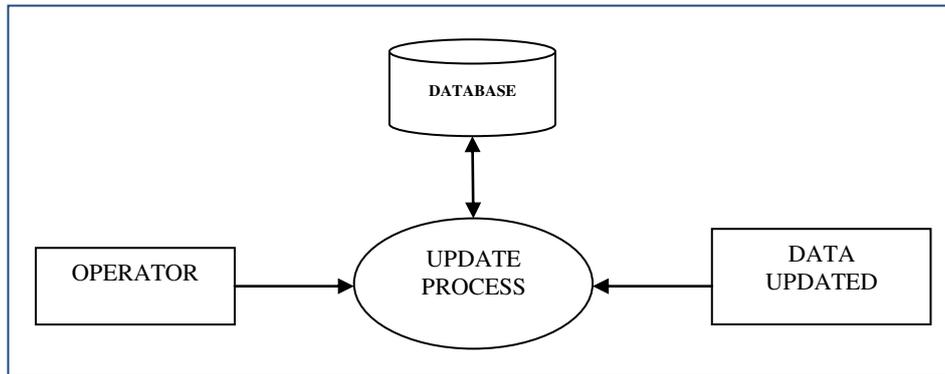


Figure-4. Updating image process.

Figure-4 shows the updating process. Update process is mainly used for updating or modifying the details of the criminal or person. This is used in situation

where we have entered the details incorrectly or we want to add some new details.

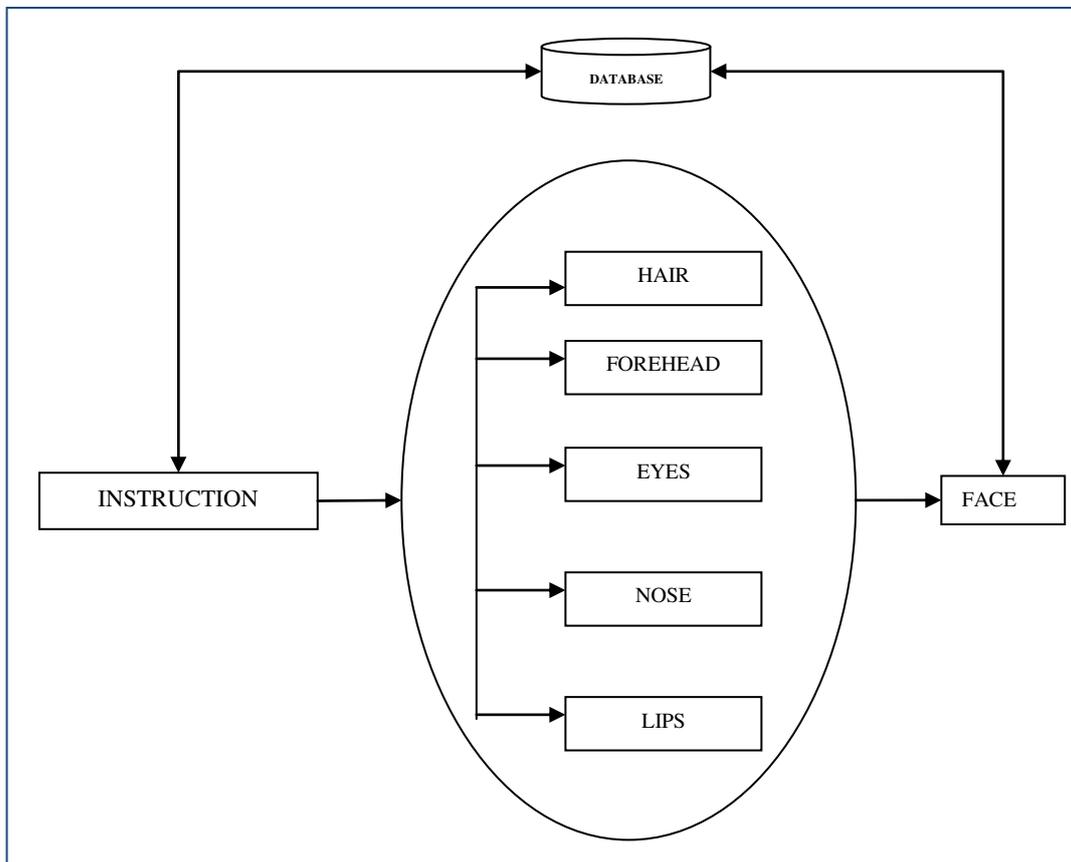


Figure-5. Construct image process.

Figure-4 shows the construction image process. Based on the instruction given by the eyewitnesses; the operator brings the clips of the images from the database

and then goes for the construction of the image based on those clips.

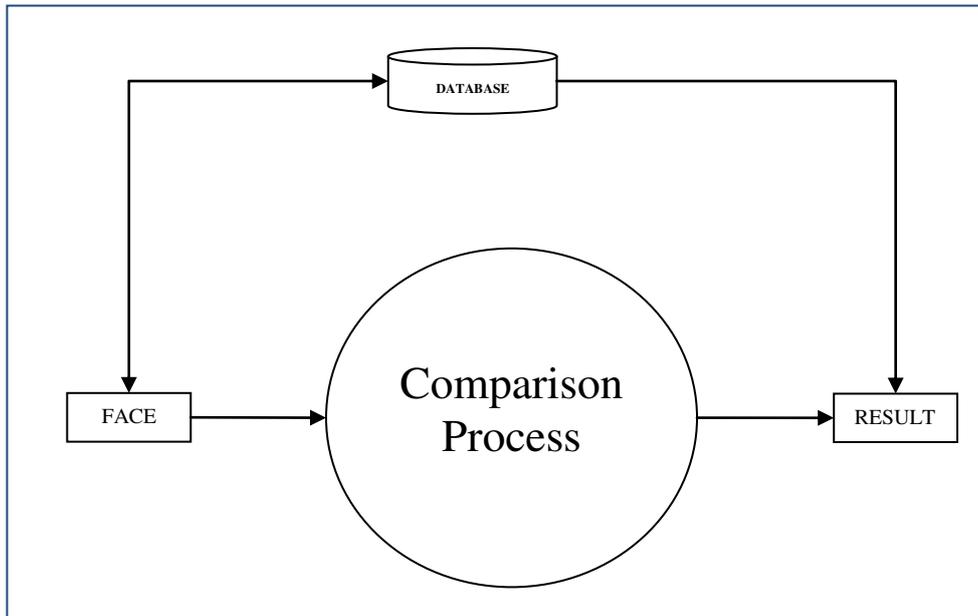


Figure-6. Criminal identification process.

Figure-6 that shows the criminal identification process. The face that is constructed in the above process is sent to the comparison process where it searches the image in the database.

3. MODULE DESCRIPTION [6, 7]

This system consists of four modules they are Add Image, Clip Image, Construct Image and Identification

Add image: Add Image is a module that is considered with adding image along with the complete details of the person of whom we are taking image. In this we add Image by importing from the Internet and store them in our system and database. This module is mainly considered for adding details of the criminals like name, age, alias name, gender, location, state, Arrested Date, etc. At the time of the adding image we give some criminal id to that particular person, so that it can be easily added to the database with any duplication of the data. This process is shown in Figure-7.

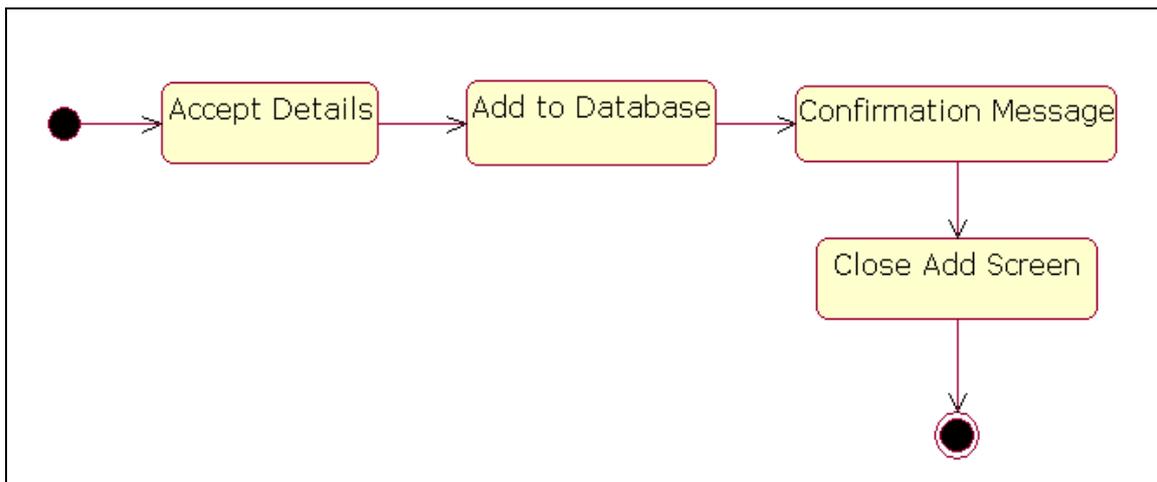


Figure-7. Add image module process.

Clip image: This modules main function is to divide the images into different pieces such as hairs, forehead, eyes, nose and lips and store them in the

database and also creates the files onto our system. This process is shown in Figure-8.

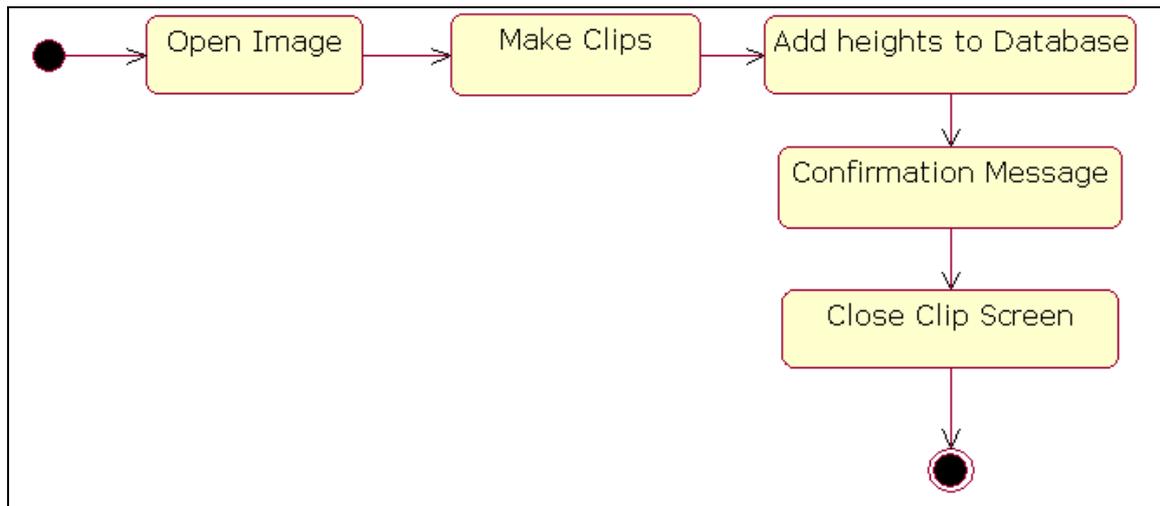


Figure-8. Clip image module process.

Construct image: Based on the eyewitnesses we are going to construct the images. The witness will give us instruction by looking onto the screen on which there will

be the parts of the images like eyes, hairs etc. This process is shown in Figure-9.

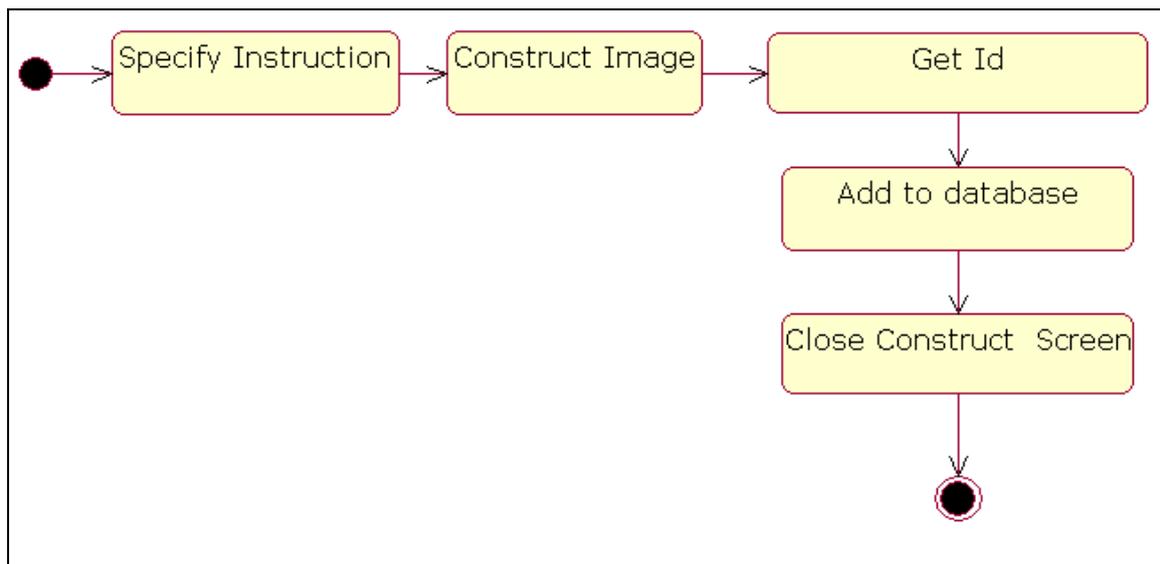


Figure-9. Construct image module process.

Identification: This module contains the interface to take the image from above module and it compares or searches with the images already there in the

database. If any image is matched then we identify him/her as the criminal else we add that new image again to the database. This process is shown in Figure-10.

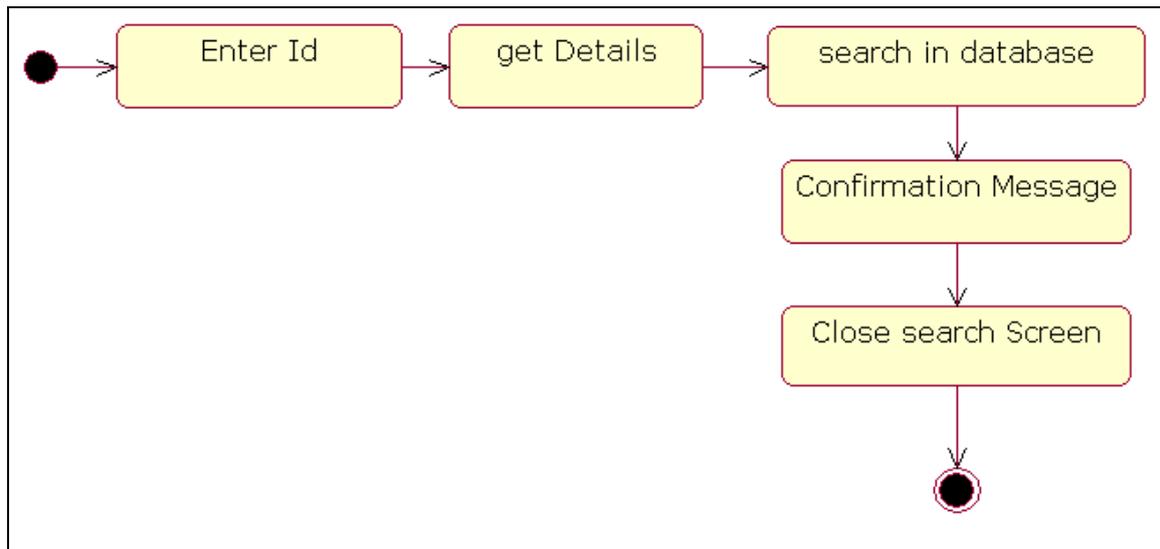


Figure-10. Identification module process.

4. DATABASE DESIGN [8]

The present system consists of four tables called FACE, CRIMINAL_SUSPECT, FACE_HEIGHTS and FACE_SUSPECTPHOTO. Table-1 shows the structure of the FACE table. Table-2 shows the structure of the CRIMINAL_SUSPECT table. Table-3 shows the structure of the FACE_HEIGHTS table. Table-4 shows the structure of the FACE_SUSPECTPHOTO table.

Table-1. FACE table structure.

Field name	Data type	Size
Criminal Id	Number	5 (Primary Key)
First Name	Varchar2	15
Last Name	Varchar2	15
Alias Name	Varchar2	15
D.O.B	Date	
Age	Number	5
Gender	Varchar2	15
Address	Varchar2	15
City	Varchar2	15
State	Varchar2	15
Arrested Date	Date	
Crime Involved	Varchar2	15
In	Varchar2	15
Photo		

Table-2. CRIMINAL_SUSPECT Table Structure.

Field Name	Data Type	Size
Criminal Id	Number	5 (Primary Key)
Cid	Number	5

Table-3. FACE_HEIGHTS table structure.

Field name	Data type	Size
Criminal Id	Number	5
Hair	Number	5
Forehead	Number	5
Eyes	Number	5
Nose	Number	5
Lips	Number	5
Chin	Number	5

Table-4. FACE_SUSPECTPHOTO Table Structure.

Field name	Data type	Size
Cid	Number	5
Suspect Photo	Varchar2	15
Suspect Height	Varchar2	15

5. RESULTS

The software has been tested with the realistic data given by the client and produced fruitful results. The client satisfying all the requirements specified by them has also developed the software within the time limitation specified. A demonstration has been given to the client and the end-user giving all the operational features. The results and interface structure is shown in Table-5.

**Table-5.** Interface structure.

S. No.	Screen	Input	Output	Remarks
1	Login Page	User Id Password	User validation	User will enter into Main Screen
2	Main Screen ▪ File ▪ New	Criminal Details are entered	Details are stored in the database	New Menu is selected to enter new criminal details.
3	Main Screen ▪ File ▪ Show Details	Display option is clicked.	Criminal Details are displayed	Display details menu is selected to get details from database.
4	Main Screen ▪ File ▪ Exit	Exit Option is Clicked.	Screen will be exited	Screen will be shut down
5	Main Screen ▪ Edit ▪ Clip Image	Criminal Image is clipped into different parts	The clips are stored in database	Clip image menu is selected to clip image and store them in database
6	Main Screen ▪ Edit ▪ Update Details	Changes in the details of the criminals are entered	Details of the criminal are updated	Update details menu is selected to update the details of the criminals
7	Main Screen ▪ Identification ▪ Construct Face	Different clips of criminals are selected and arranged in order	Face of the criminal is constructed	Construct face menu is to construct the criminal face from various clips stored in the database.
8	Main Screen ▪ Identification ▪ Find Face	Show all suspects is checked	All suspects detail along with photo are displayed	Show more suspect menu is selected to get the details of all suspects and more possible suspect involved in crime.
9	Main Screen ▪ Help ▪ About	About Face Identification is checked	The version and the overview of the system is displayed	About face identification system menu is selected to get the details of above system.

6. CONCLUSIONS

The purpose of face identification system is to identify criminals. In past years this process is carried out by humans. This process gives the exact image of the criminal but it is very difficult to identify the criminal details and also it requires much amount of human burden. The main aim of our system is to overcome the drawbacks of human based system by using the machine based face identification process. In this process we store the details of criminal into the database along with his photo or image. Then we make the image into different clips containing hair, forehead, eyes, nose, lips and chin and store these clips into the database. When any crime occurs we compare the details given by the eyewitness with the clips already stored in the database and we will identify the criminal. This system can be extended to adjust the gaps between the clips after

construction of the image to be a perfect photograph using Image processing Techniques.

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