Identifying criminals based on the clues given by eyewitness using Face Identification Method

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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 method; Image; Data base; Image pixels; criminal's identification.

I. INTRODUCTION

Face Identification 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 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. This paper is aimed to identify the criminals 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 Paper it provides a very friendly environment for both operator and eyewitness to easily design any face can identify criminals very easy. This paper is intended to identify a person using the images previously taken. The identification will be done according the previous images of different persons.

The scope of the paper is confined to store the image and store in the database. When a person has to be identified the images stored in the database are compared with the existing details.

A. *Overview:*

This paper can be used to identify a criminal in the investigation department and it maintains the photographs of all the criminals. Each photograph is clipped into different parts.

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.

Proposed System: 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.

B. *Overview of The Proposed System:*

➢ Addition, Clipping, Construction and updating of the criminal record and face.

➢ Comparing the image with the faces that are there in our database.

➢ If any new images are found then it should be entered into our database by add image module and then it should be segmented into different slices.

II. MODULES

A module is a small part of our Paper. This plays a very important role in the Paper and in coding concepts. In Software Engineering concept we treat it has a small part of a system but whereas in our programming language it is a small part of the program, which we also called as function in, some cases which constitute the main program. Importance of modules in any software development side is we can easily understand what the system we are developing and what its main uses are. At the time of Paper we may create many modules and finally we combine them to form a system.

A. 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.

B. 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.

C. 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.

D. 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.

III. SYSTEM DESIGN

A. Class Diagram:

Class diagrams are the most common diagrams found in modeling object-oriented systems. A class diagram shows a set of classes, interfaces, and collaborations and their relationships. Graphically, a class diagram is a collection of vertices and arcs.
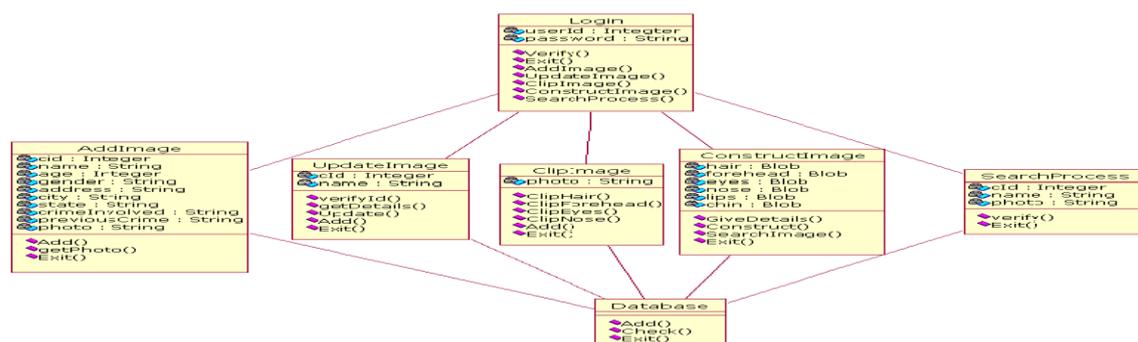

Fig. 2 Class Diagram of Face Identification.

B.   Sequence Diagram:

A sequence diagram is an interaction diagram that emphasizes the time ordering of the messages. Graphically, a sequence diagram is a table that shows objects arranged along the X-axis and messages, ordered in increasing time, along the Y-axis.

Typically you place the object that initiates the interaction at the left and increasingly more sub-routine objects to the right. Next, you place the messages that these objects send and receive along the Y-axis, in order of increasing time from top to the bottom. This gives the reader a clear visual cue to the flow of control over time.
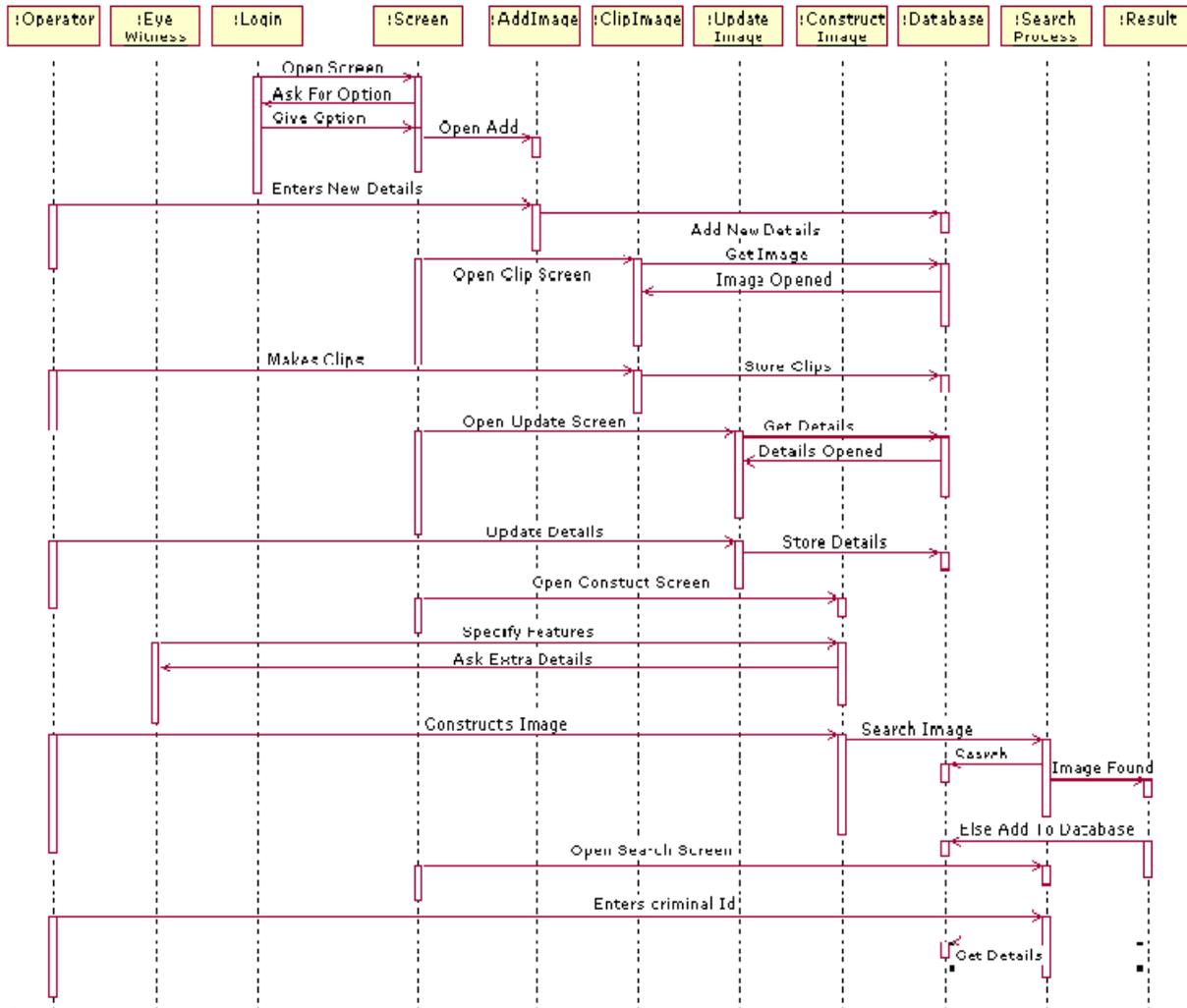

Fig. 2 Sequence Diagram of Face Identification.

C.   Activity Diagram:

An Activity Diagram is essentially a flow chart showing flow of control from activity to activity. They are used to model the dynamic aspects of as system. They can also be used to model the flow of an object as it moves from state to state at different points in the flow of control. An activity is an ongoing non-atomic execution with in a state machine. Activities ultimately result in some action, which is made up of executable atomic computations that result in a change of state of distinguishes a use case diagram from all other kinds of diagrams is its particular content.
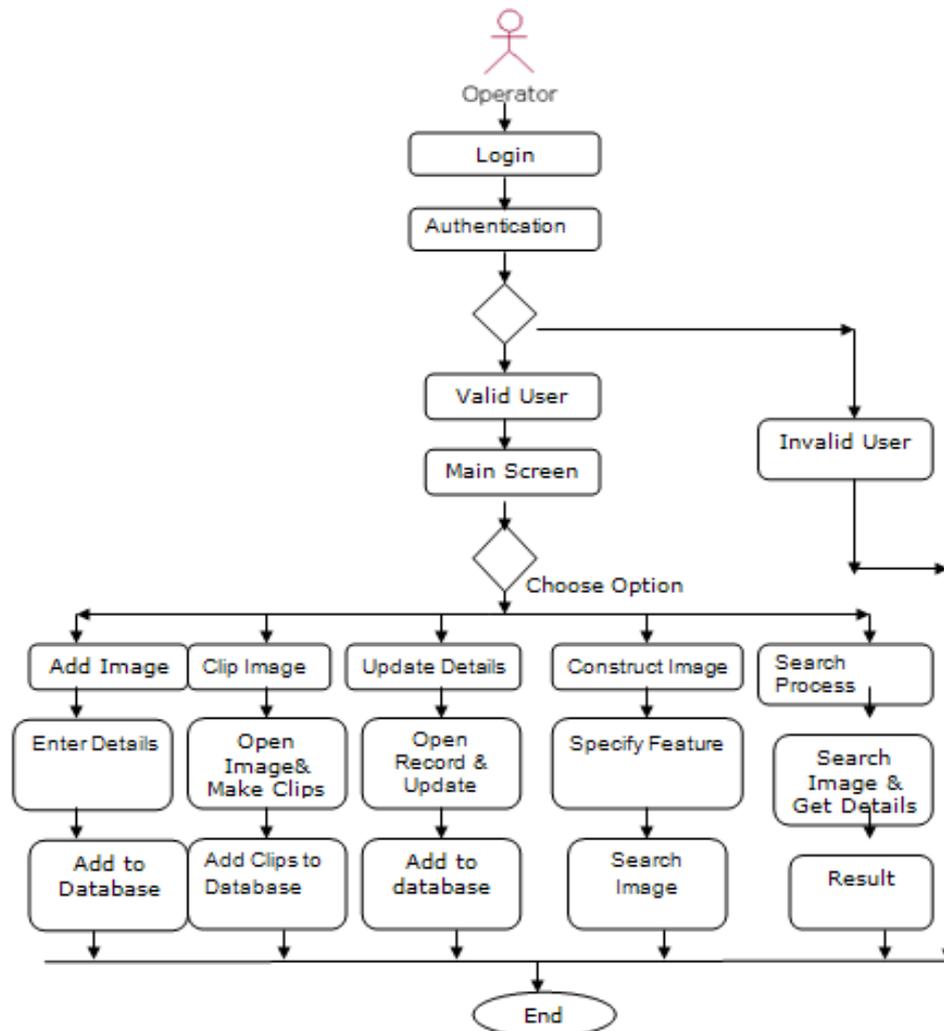
Fig. 3 Activity Diagram of Face Identification

D. Detailed Design:

Design is the first step in moving from problem domain to the solution domain. Design is essentially the bridge between requirements specification and the final solution.The goal of design process is to produce a model or representation of a system, which can be used later to build that system. The produced model is called the "Design of the System". It is a plan for a solution for the system.

E. Face Identification System:
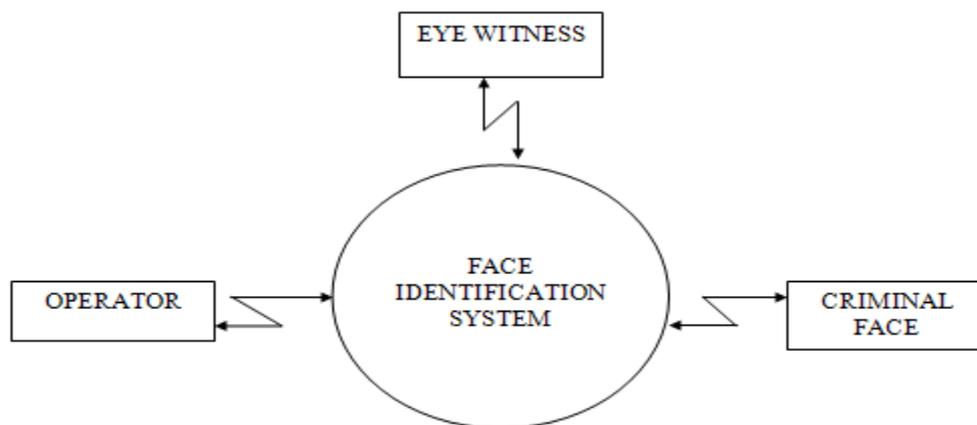
Context Flow Diagram

Context Flow Diagram gives us the complete details about the inputs and outputs for a given system. In the above system 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:

Level 1: 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.

Main Process Screen:

Level 2: 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.

Add Image Process:

Level 3: 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.

Clipping Process:

Level 4: 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.

Update Process:

Level 5: 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.

Construct Image:

Level 6: 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.

Comparison Process:

Level 6: The face that is constructed in the above process is sent to the comparison process where it searches the image in the database.

IV. CONCLUSION

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 Paper 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 Paper can be extended to adjust the gaps between the clips after construction of the image to be a perfect photograph using Image processing Techniques.

References

1. S. C. Dass and A. K. Jain. Markov face models. In Proceedings, Eighth IEEE International Conference on Computer Vision (ICCV), pages 680–687, July 2001.

2. C.-C. Han, H.-Y. M. Liao, G.-J. Yu, and L.-H. Chen. Fast face detection via morphology-based pre-processing. In Proceedings, Ninth International Conference on Image analysis and Processing (ICIAP), volume 2, pages 469–476, 1998.

3. J. Huang and H. Wechsler. Eye location using genetic algorithm.In Proceedings, Second International Conference on Audio and Video-Based Biometric Person Authentication, pages 130–135, March 1999.

4. T. Leung, M. Burl, and P. Perona. Finding faces in cluttered scenes using labeled random graph matching. In Proceedings, Fifth International Conference on Computer Vision, pages 637–644, June 1995.

5. M. Kirby and L. Sirovich, "Application of the Karhunen-Lo´eve procedure for the characterization of human faces," IEEE Trans. Pattern Analysis and Machine Intelligence, vol. 12, no. 1, pp. 103–108, Jan. 1990.

6. ORL face database, http://www.uk.research.att.com/facedatabase.html

7. A. Pentland, B. Moghaddam, and T. Starner, "View-based and modular eigenspaces for face recognition," in Proc. IEEE Computer Society Conference on Computer Vision and Pattern Recognition, Jun. 1994, pp. 84–91.

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