Conan:Finding missing people

Mohamed Atta Ibrahim

Mohamed Yasser Ahmed

Mahmoud Mohamed Benyamin

Hady Ashraf Ragab

Yousef Abdelbadea Ali

Supervisor:Dr. Mahmoud Khalil

Department of Computer and Systems Engineering

Faculty of Engineering at Ain Shams University

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Contents

Introduction **6**

1 project description **7**

2 Beneficiaries of the project **8**

3 Detailed analysis **9**
3.1 Face recognition 9

4 Detailed description of the adopted techniques **11**

5 Time plan **12**

6 System architecture **13**

7 database design **14**

8 System design **16**

9 Testing scenarios and results **17**

10 End user guide **22**

11 Conclusion **28**

List of Figures

1 image system block diagram 7
2 Face recognition 9
3 time plan 12
4 System architecture class-diagram 13
5 class-diagram 13
6 DB EER Diagram 14
7 Database Schema 14
8 image feature exract diagram 15
9 image query diagram 15

List of Tables

Abstract

This paper presents imp DIP project

Introduction

In this project the user can find missing people by search with the old pictures or young pictures of missing people. The project uses techniques that extract features from the pictures and check similarity between the query picture and the pictures in the dataset to retrieve the similar picture to the query picture.

1 project description

This is a python desktop application, it applies the Pattern Recognition and Digital Image Processing techniques to analyze, design, and implement multi-media retrieval system, where the media that we are going to use are the images .we have implemented many techniques belong Pattern Recognition and Digital Image Processing and AI techniques in retrieval and face Recognition. .

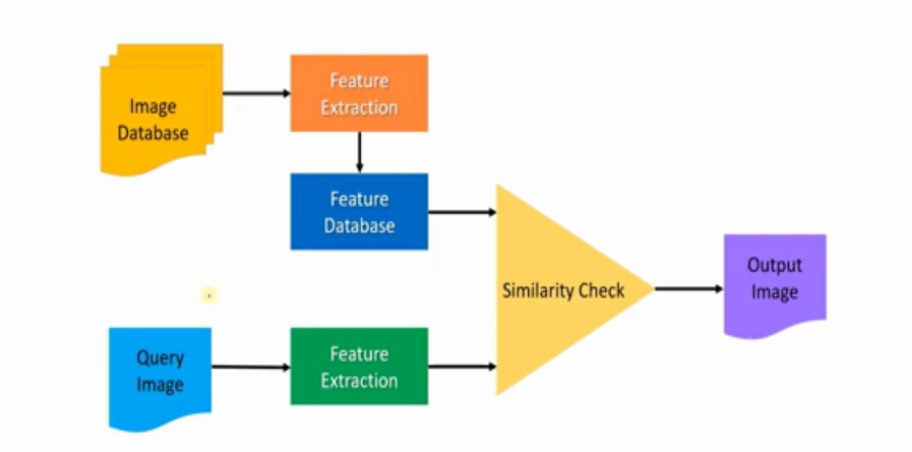


Figure 1: image system block diagram

2 Beneficiaries of the project

The family who want to find any one of their members because of missing of him. Any one who the government wants to find from his traffic camera's pictures to detect his data and find him.

3 Detailed analysis

This project deals with Content Based Image Retrieval(CBIR). For the CBIR, the adopted method is face recognition and then after the user provide the image(person) that he/she want to search for. The program extract features of the images dataset and save it then extract the features of the input image and compare the image with extracted feature database(persons saved in dataset) and after that compares it using Intersection Distance method to detect the closet person for input images and his/her information (if it was inserted to the database)

3.1 Face recognition

Face recognition software use computer algorithms to determine specific, distinguishing features on a human's face Some features, like eyeball proximity or jaw shape, would then be transformed into a mathematical model and analyzed to data from other faces in a face recognition dataset. A face template is data on a specific face that differs from an image in that it is designed to only include certain traits that could be used to recognize a face over others

Figure 2: Face recognition

Rather than precisely recognizing an unidentified individual, certain facial recognition technologies are intended to compute a probabilistic match score between both the unidentified individual and certain face templates stored in the dataset. Rather than providing a single result, such algorithms will present numerous probable matches, sorted in order of probability of right identification.
Facial recognition systems differ in their capacity to recognize persons under difficult situations, including such dim lighting, poor picture quality, as well as a skewed angle of view (such as in a photograph taken from above looking down on an unknown person).
When it comes to errors, there are two key concepts to understand:
Whenever a facial recognition system fails to capture an individual's face to a picture which is in fact stored in the dataset this is known as a "false negative."

In other terms, the algorithm will respond to a query with zero results, which is incorrect.
Whenever a facial recognition algorithm matches a human's face to a picture inside a dataset, however the similarity is inaccurate, it's called a "false positive." If a policeman sends an image of "Joe," the system incorrectly informs the cop that the image is of "Jack."
While looking into a facial recognition algorithm pay special attention towards the "false positive" and "false negative" ratios, because there is almost always an exchange. When you use facial recognition to unlock your device, for example, it's preferable if the algorithm misidentifies you a few occasions (false negative) than for the system to misidentify other individuals as you and allow them to access your mobile (false positive). If a mistaken identity leads to the incarceration of an innocent individual (such as a mugshot database misidentification), the system must be developed to get as few false positives as possible.

some distance that we used to measure similarity

- Absolute Distance

$$D_{Absolute}(h, \bar{h}) = \sum_{K-1}^{K} |h_K - \bar{h_K}| \tag{1}$$

- Euclidean Distance

$$D_{Euclidean}(h, \bar{h}) = \sqrt{\sum_{K-1}^{K} (h_K - \bar{h_K})^2} \tag{2}$$

- Intersection Distance

$$D_{Intersection}(h, \bar{h}) = 1 - \sum_{K-1}^{K} in(h_K, \bar{h_K}) \tag{3}$$

4 Detailed description of the adopted techniques

For face recognition we use face recognition library part of dlib we detect features of persons faces ex (eye color , eye size , iris , face parts ratios) using face recognition from dlib to extract features and then save them in .csv file

steps

1. Resize image to make it take less time
2. Turn it to gray
3. Extract features
4. Save features in .csv file
5. (optional) add information for the person in the image to add it to our database so it'll appear when we search through images

distance

we use Intersection Distance error method to compare between the image we search for (after extracting features) and features of the images saved in database Intersection Distance

$$D_{Intersection}(h, \bar{h}) = 1 - \sum_{K-1}^{K} in(h_K, \bar{h_K}) \tag{4}$$

Meaning the lower the distance the better (closer to image we search for)

5 Time plan

In Prepairing Datasets phase, We search for qualified dataset that qualify project. In parrallel, Extraction Features Algorithms design are finished. The software is developed and then make testing for all functionality of the program.

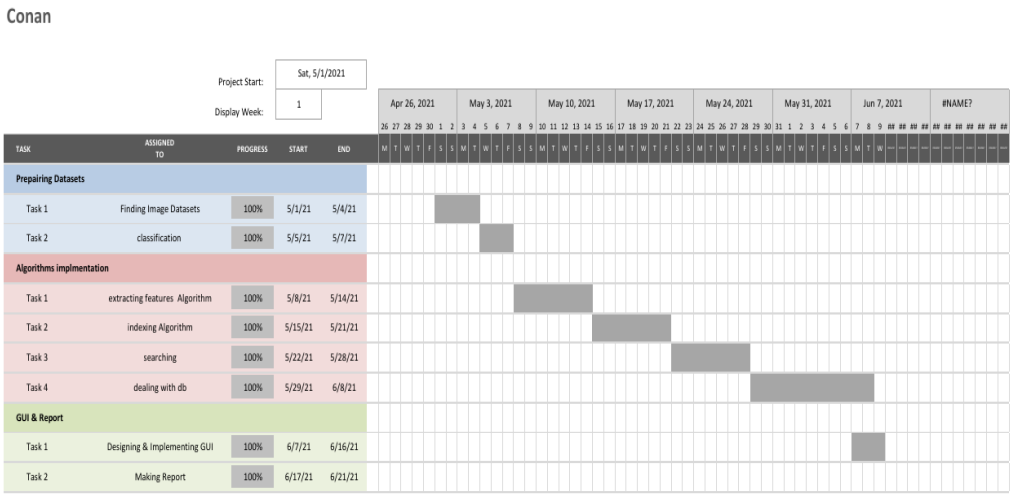


Figure 3: time plan

6 System architecture

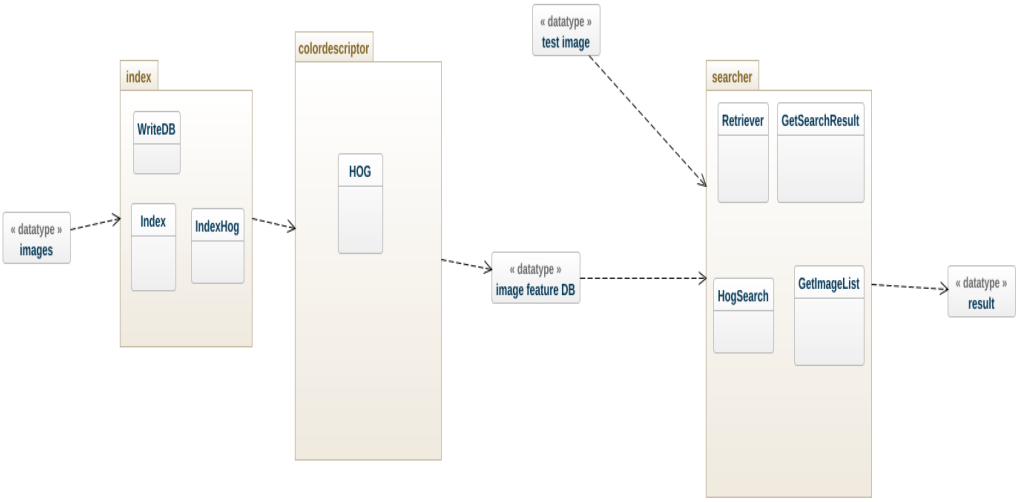


Figure 4: System architecture class-diagram

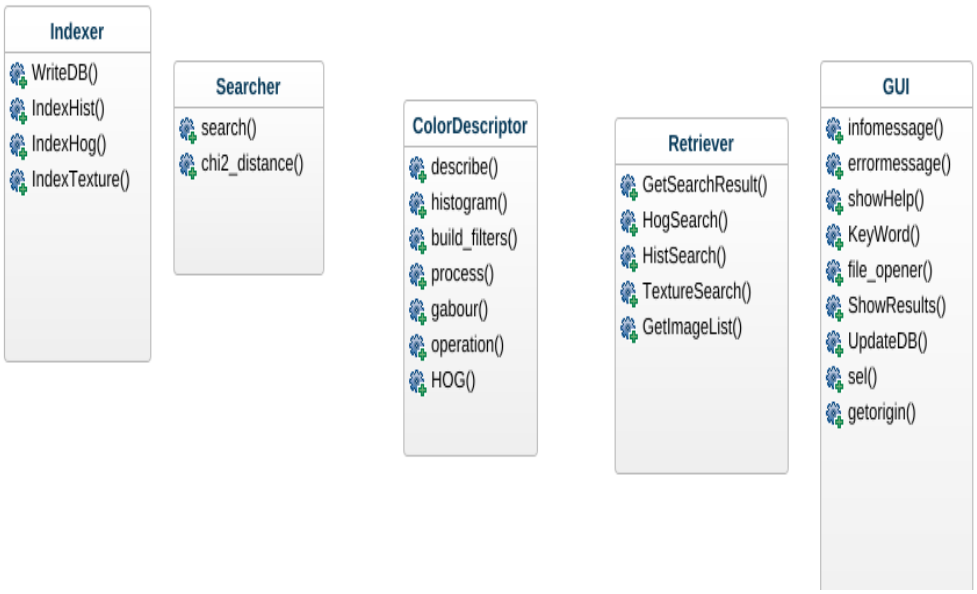


Figure 5: class-diagram

7 database design

- We implemented the schema in sqlite and store features in csv file which ID is the path of the image.

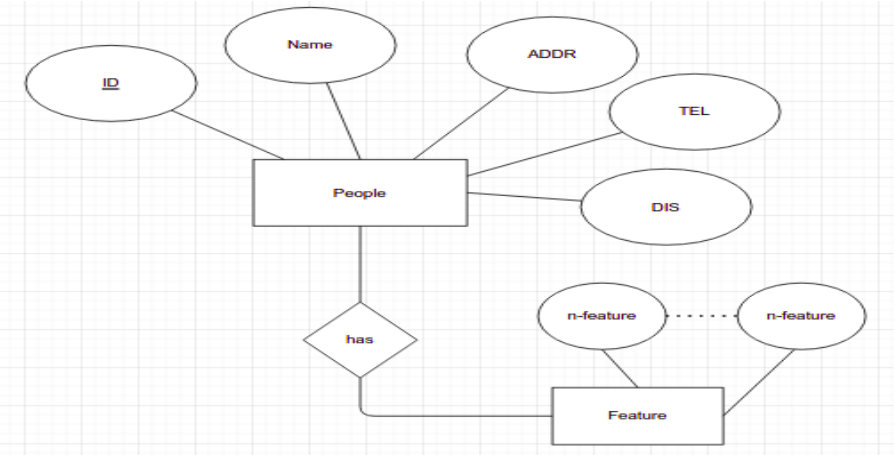


Figure 6: DB EER Diagram

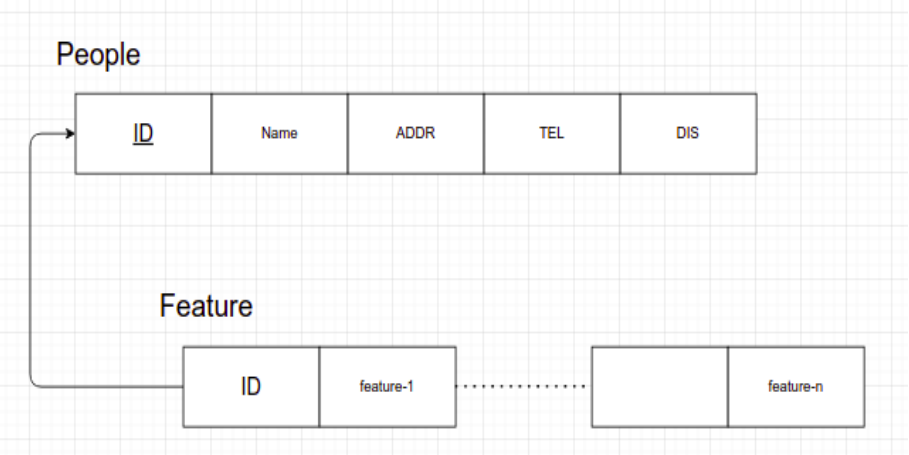


Figure 7: Database Schema

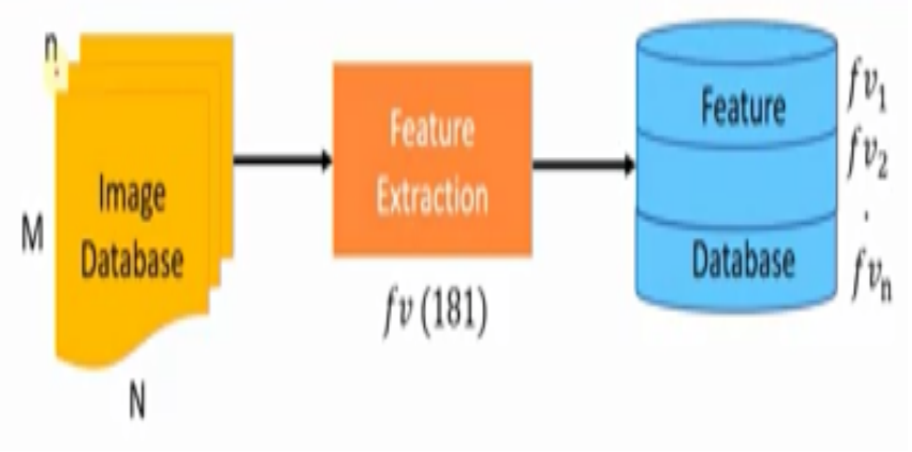


Figure 8: image feature exract diagram

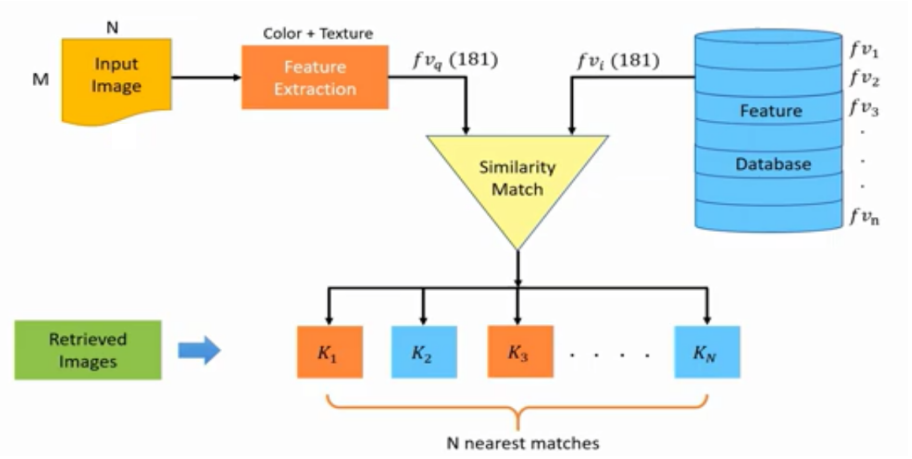


Figure 9: image query diagram

8 System design

1. **system database**
   in this project we have a database for images which has a CSV file each one store features for all techniques.

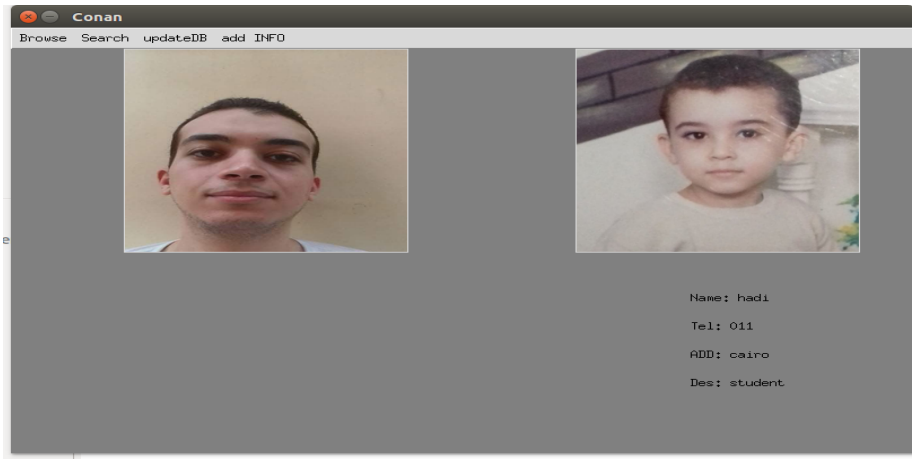
2. **user UI**
   this is a GUI the user interact with to make queries.

3. **the processing part**
   this part is responsible to process images according to the selected technique.

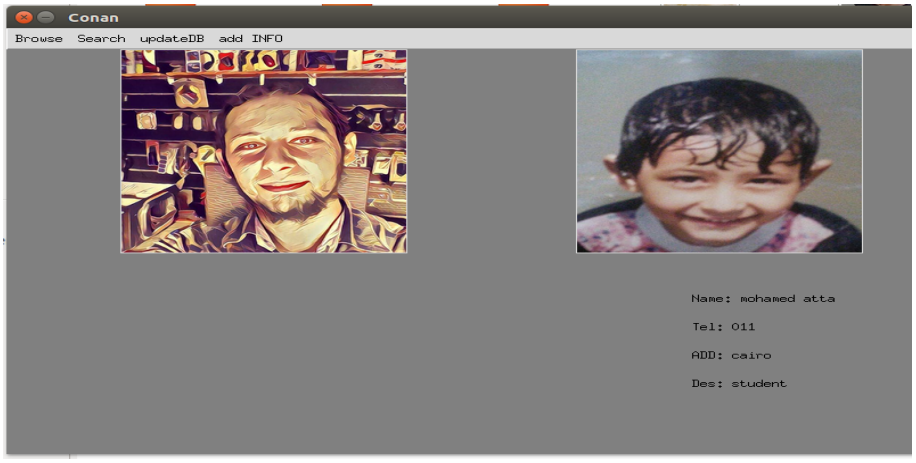
4. **operating scenario**
   first we build our database for images for all technique and then select from GUI image search if image user select the technique and the image want to search with. all data from GUI is passed to the processing part to give results and print it in the GUI

9 Testing scenarios and results

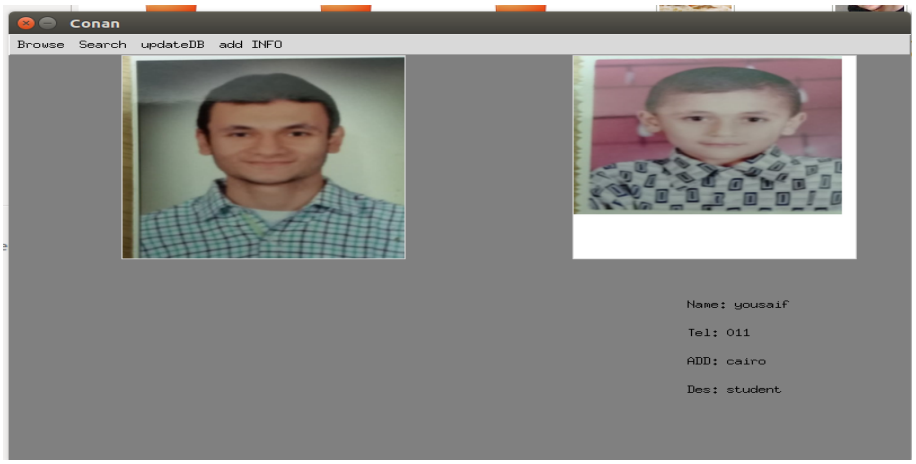
- search for one member of team using his old pic and we get the younger pic that stored in our DB



- search for one member of team using his old pic that has some animation as noise and we get the younger pic that stored in our DB

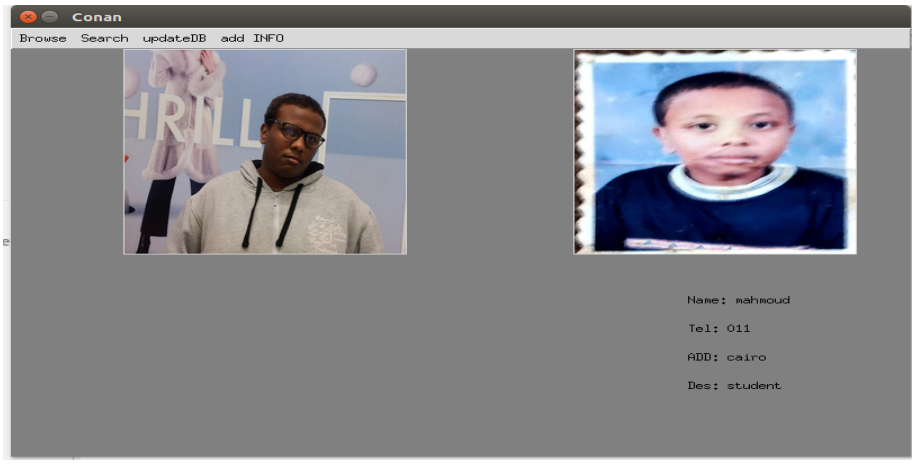


- search for one member of team using his old pic that scanned from mobile and we get the younger pic that stored in our DB

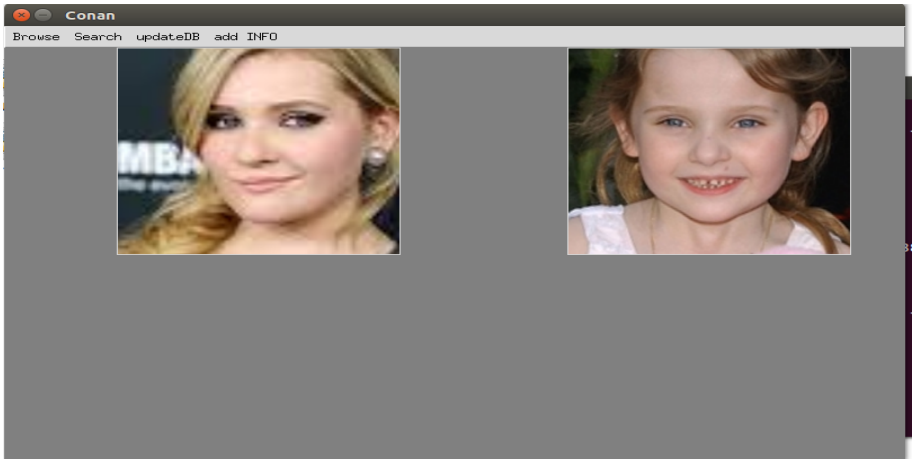


- search for one member of team using his old pic that scanned using digital scanner and we get the younger pic that stored in our DB

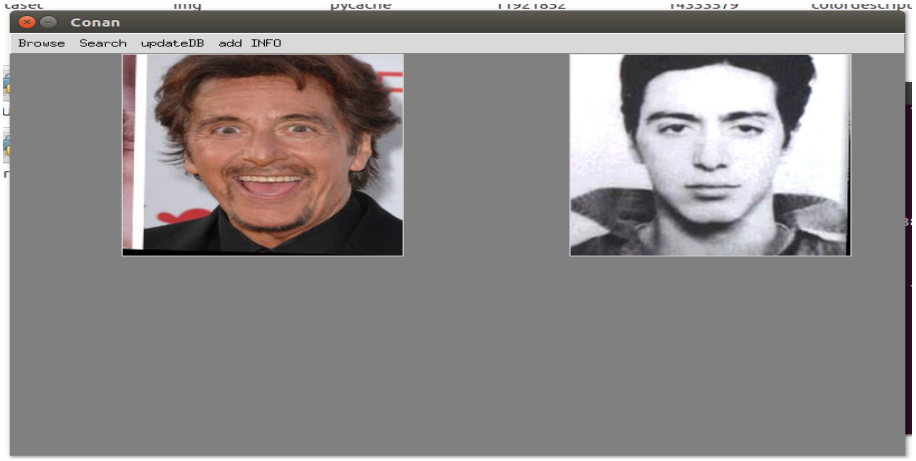
- search for one member of team using his old pic that taking by digital camera and we get the younger pic that stored in our DB



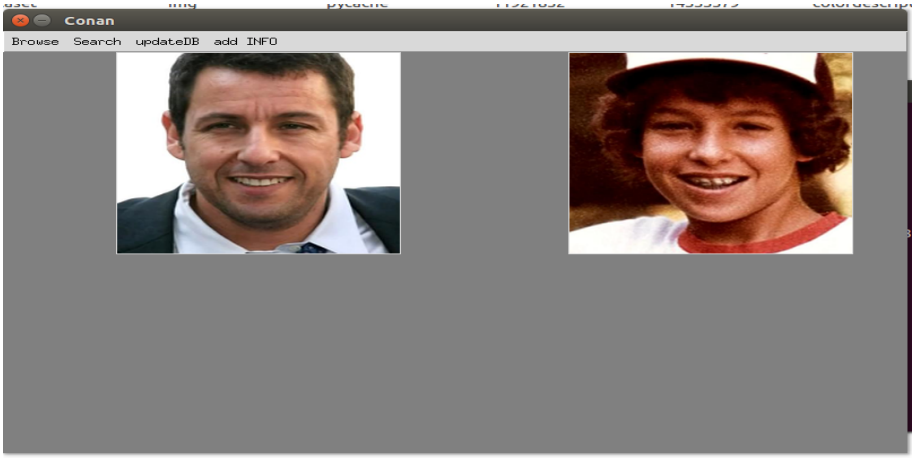
- search for an actress using her old pic and we get the younger pic that stored in our DB



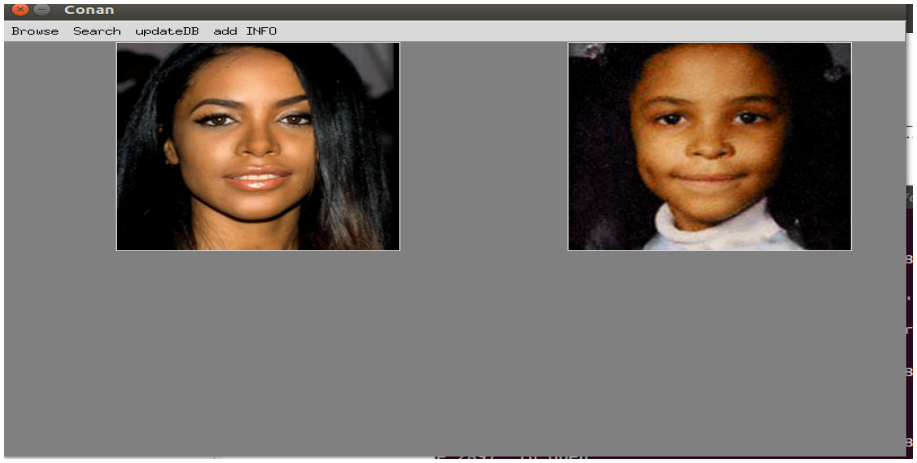
- search for an actor using his old pic and we get the younger pic that stored in our DB even if it is black and white



- search for an actor using his old pic and we get the younger pic that stored in our DB

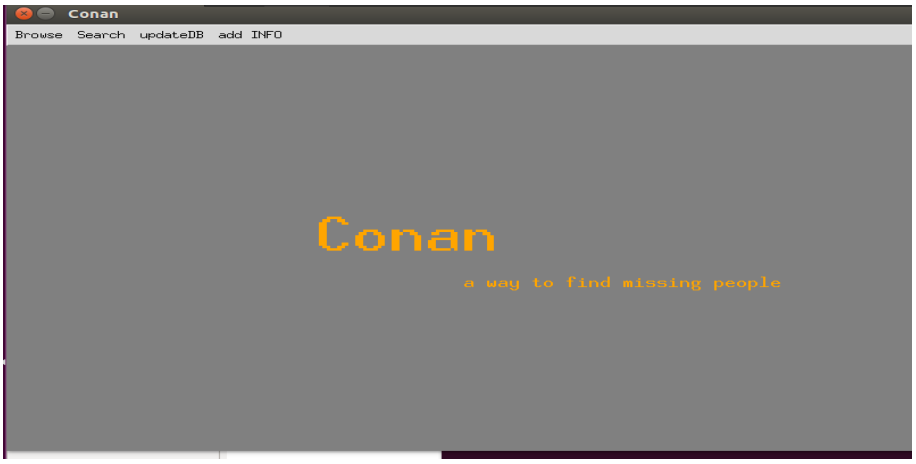


- search for an actress using her old pic and we get the younger pic that stored in our DB

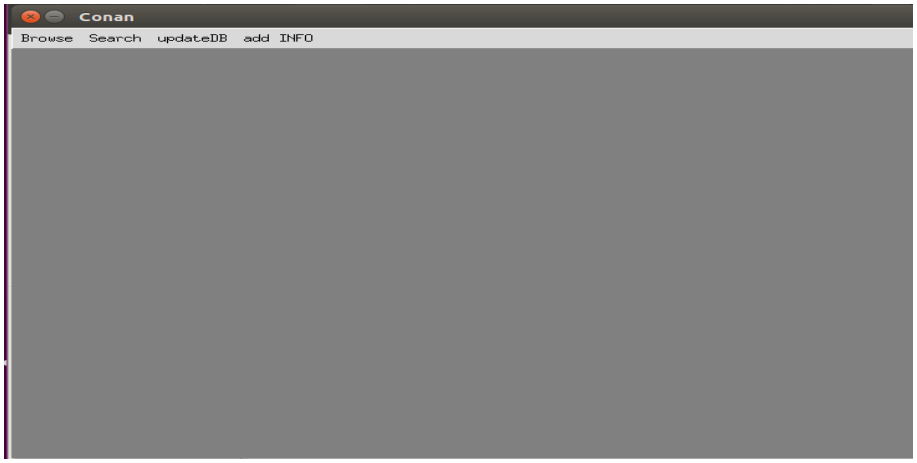


10 End user guide

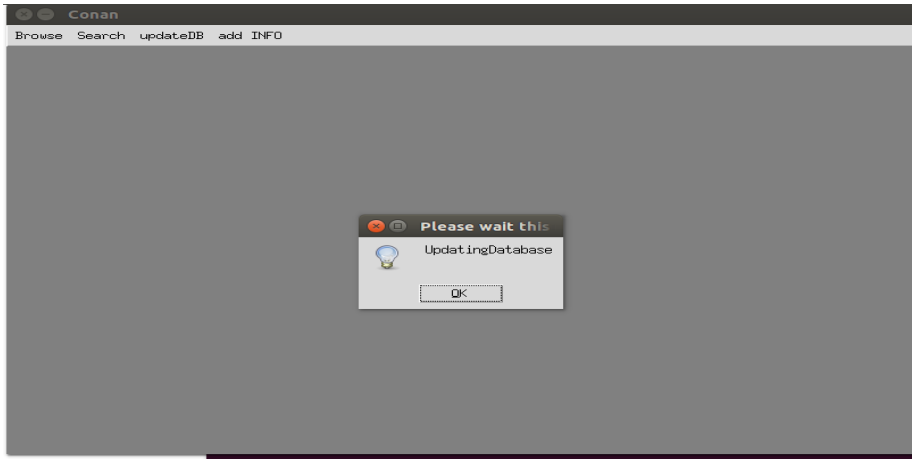
1. This is the primitive user interface.



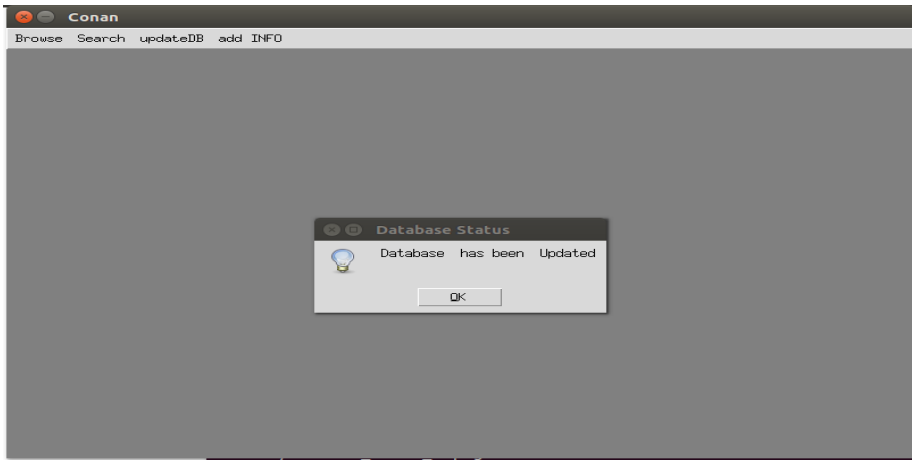
2. before to go in query we need to build database first so go from updateDB



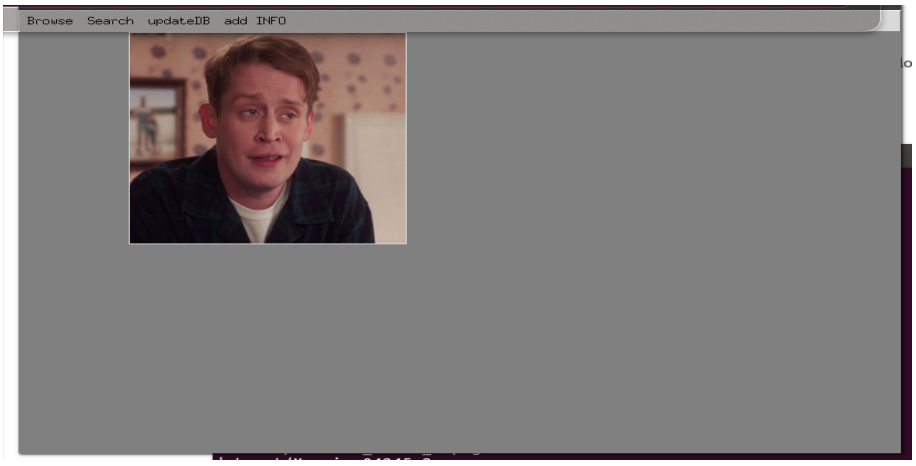
3. It may take a time and give you alert message for waiting.



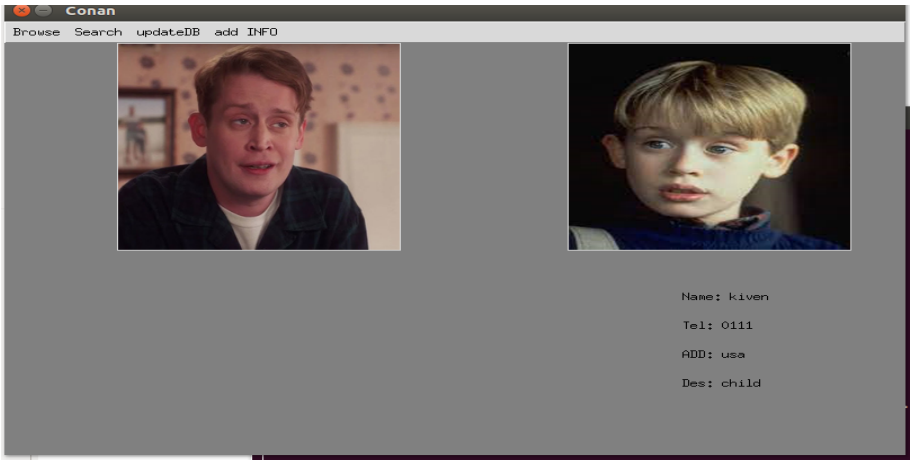
4. When the database is finished updating, a message Database Status will appear.



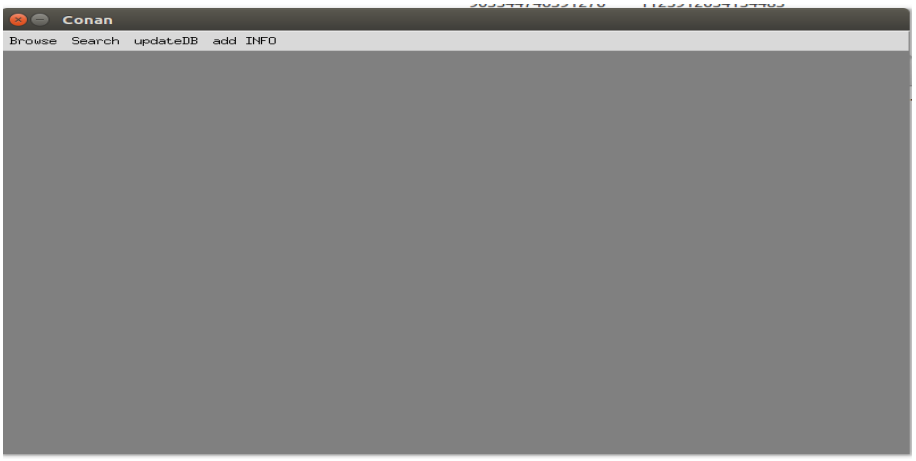
5. now we can search for any image we want From Browse choose Image ex Image.



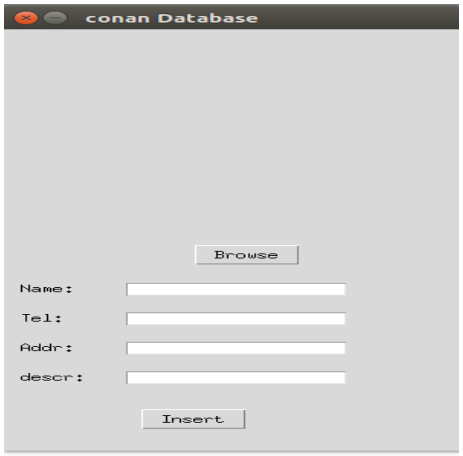
6. to get the result Click on search button and the result will appear in the area for displaying results, and when you click at any result image it will be standalone

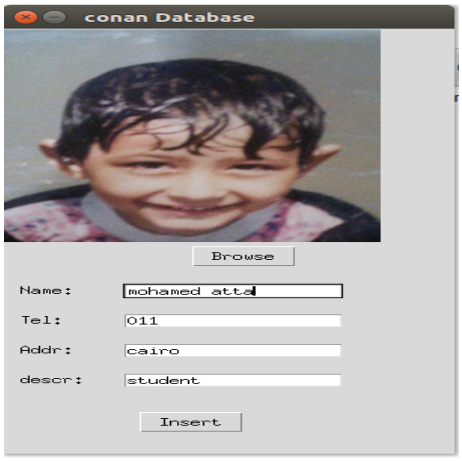


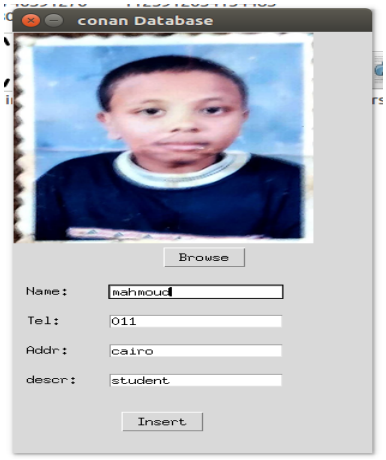
7. to enter information to image click to add INFO.

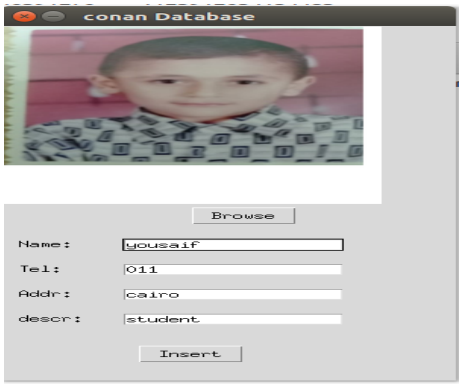


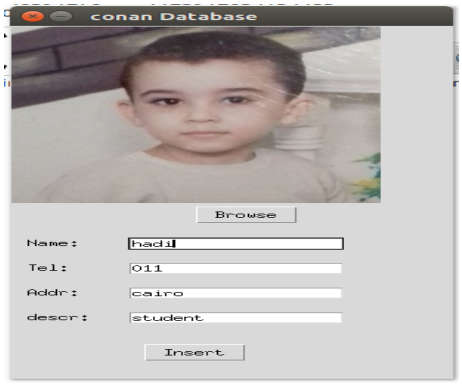
8. another page will appear to enter information in diffrant fields.











9. When finshed entering info , a message Status will appear.

11 Conclusion

Finally, Conan application has been able to recongize missing people even if they have different ages.