

Class attendance system using face detection

Supervised by:

Dr. / Waleed Makram

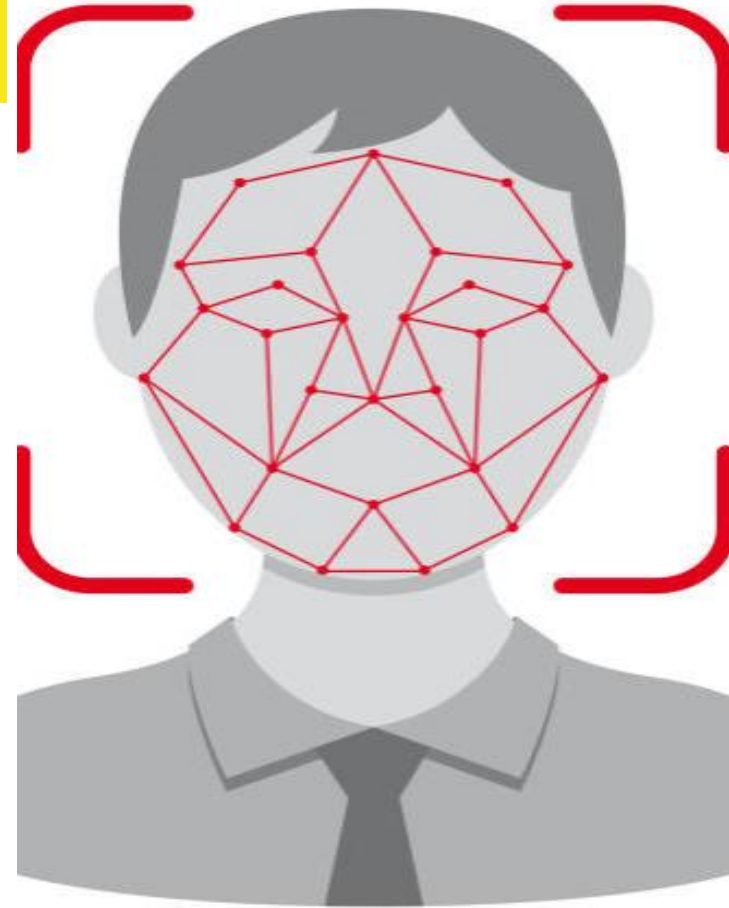
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Content



Problem

Analysis

Solution

Prototype

Software Design

- Use case
- Sequence diagrams
- Class diagram
- ERD
- Database

Results and Conclusion

Problem



- Traditional method (Sheet - Paper)
- Waste of time
- Incorrect attendance
- Causes a lot of disturbance
- Takes lot of effort and time
- Human error

Multimodal biometrics



Analysis the problem

- Use one of biometrics for authentication and identification
- Biometrics is the science that allows a person to be identified and authenticated based on a set of recognizable and verifiable data, which are unique and specific to them.
- Types of biometrics:
 - Face Recognition.
 - Fingerprint Recognition.
 - Iris Recognition.
 - Hand Recognition.
 - Voice Recognition.
 - Signature Recognition.

Face Recognition

- **WHY ?**
- WHAT ?
- Implementation ?
- How works ?

WHY face recognition?

Because while it compare with other biometric options,

It is :

- **Accurate**
- **Allows for high enrolment and verification rates**
- **Require zero effort from the user**

Face Recognition

- WHY ?
- **WHAT ?**
- Implementation ?
- How works ?

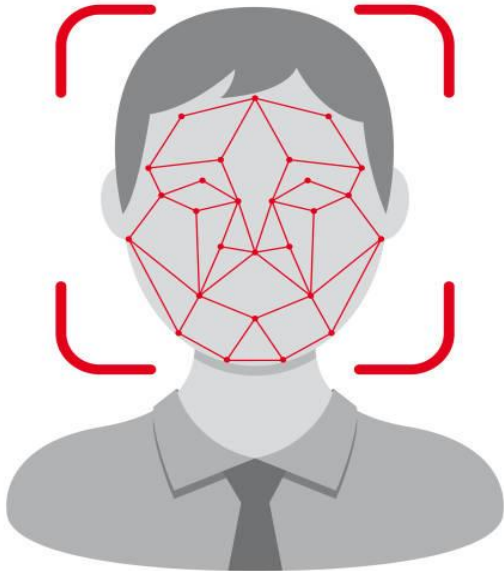


WHAT is face recognition?

- Face recognition system is a one type of biometric computer application which can identify or verify a person from a digital image by comparing and analyzing patterns.
- One of the ways to do this is by comparing selected facial features from the image and facial database
- Present facial recognition systems work with face prints and these systems can recognize 80 nodal points on a human face to measure variables on a person's face, which includes the length and width of the nose, cheekbone shape and the eye socket depth.

Face Recognition

- WHY ?
- WHAT ?
- **Implementation ?**
- How works ?

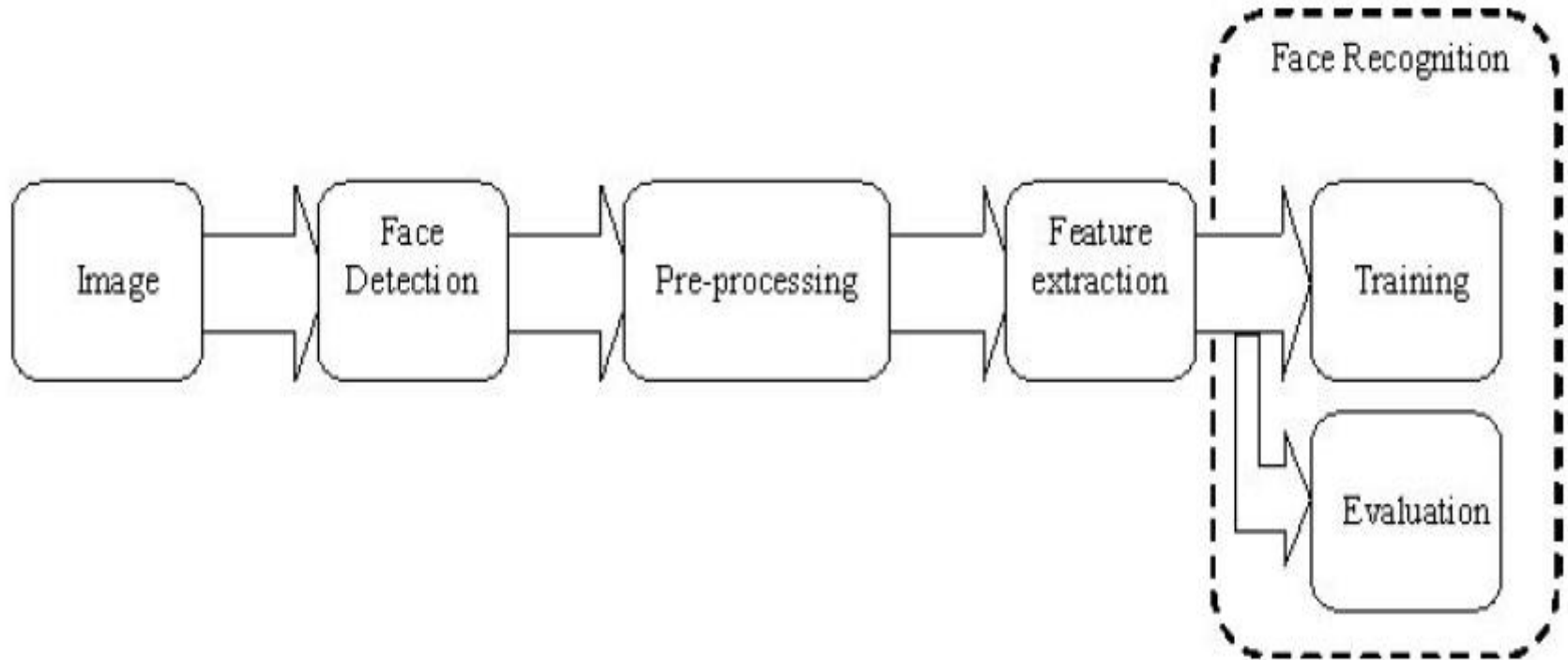


Implementation of face recognition?

Includes the following three stages

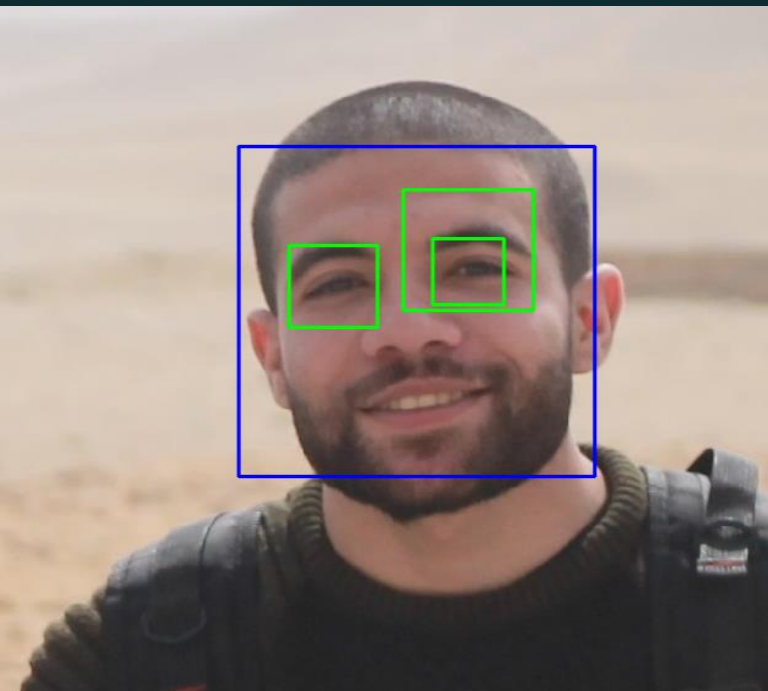
- Image Acquisition (Face detection)
- Face image classification and decision making (Features extraction)
- Computer vision (Face Recognition)

System Architecture Diagram



Face Recognition

- WHY ?
- WHAT ?
- **Implementation ?**
- How works ?



1-Image Acquisition (Face detection)

- Facial-scan technology can acquire faces from almost any static camera or video system that generates images of sufficient quality and resolution
- High-quality enrolment is essential to verification and identification enrolment images

Face Recognition

- WHY ?
- WHAT ?
- **Implementation ?**
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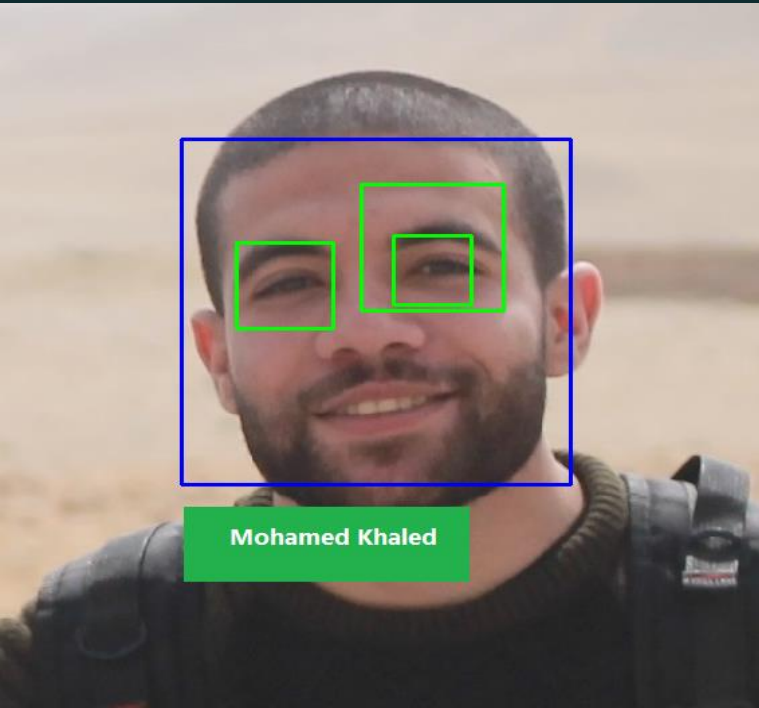


2-Face image classification and decision making (Features extraction)

- All facial-scan systems attempt to match visible facial features in a fashion similar to the way people recognize one another.
- The features most often utilized in facial-scan systems are those least likely to change significantly over time:
 - Upper ridges of the eye sockets
 - Areas around the cheekbones
 - Sides of the mouth
 - Nose shape
 - The position of major features relative to each other.

Face Recognition

- WHY ?
- WHAT ?
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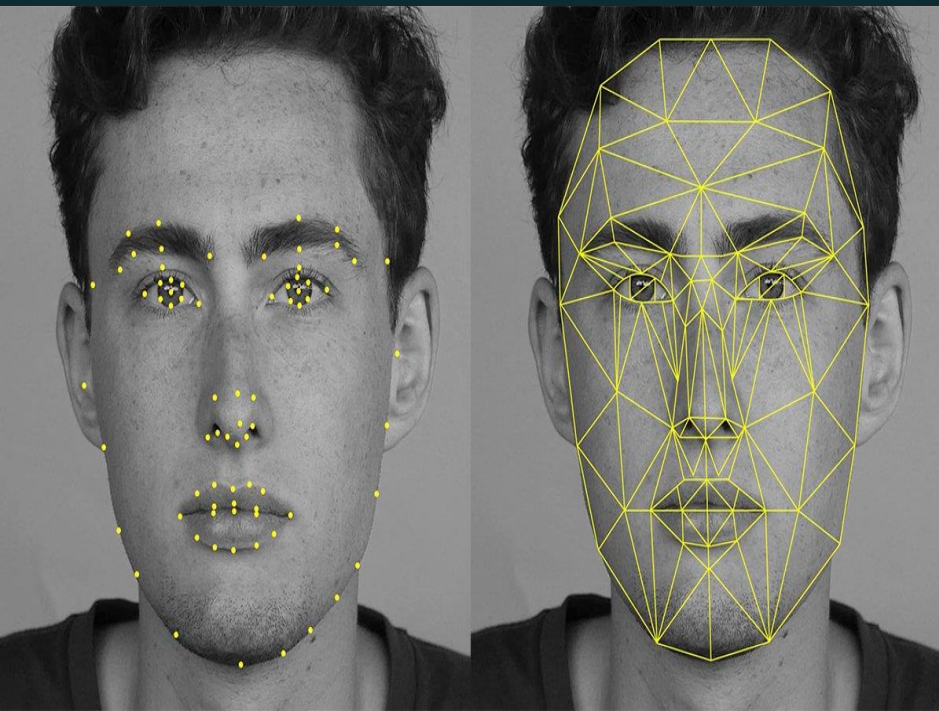
3-Computer vision (Face Recognition)

- Images are cropped and colour images are normally converted to black and white image (Binary image) in order to facilitate initial comparisons based on gray scale characteristic
- First, The presence of faces of the students in the class must be detected.
- Once the face is detected, it must be localized and normalization process may be required to bring the dimensions of the live facial sample in alignment with the one on the template

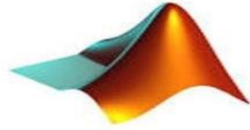
Face Recognition HOW Facial Recognition works?

- WHY ?
- WHAT ?
- Implementation ?
- **How works ?**

- Every face has at least 80 distinguishable parts called nodal points.
 - Here are few nodal points below :
 - Distance between the eyes
 - Depth of eye sockets
 - Width of the nose
 - Length of jaw line
 - Structure of the cheekbone



Solution



vs.

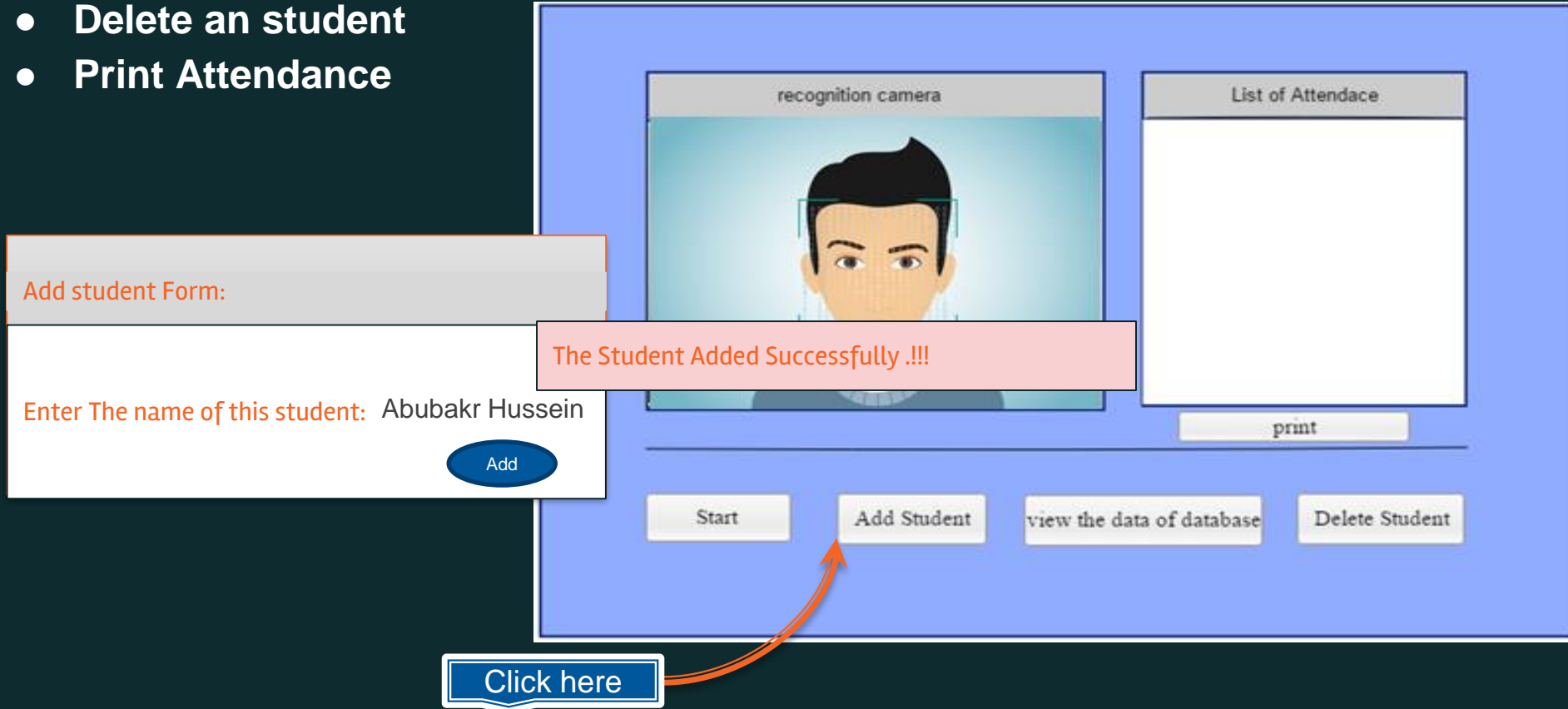


- We are going to make a desktop application
- We can implement it in Matlab or Python
- MATLAB or Python has some advantages for image processing:
 - The ability to call external libraries, such as OpenCV
 - A very large database of built-in algorithms for image processing and computer vision applications.
 - A large user community with lots of free code and knowledge sharing
 - There is desktop environment which allows you to work interactively with our data, files, variables and simplifies common programming/debugging tasks

Prototype











- **Add new student**
- Delete an student
- Print Attendance

When the user want to add a new student in the database

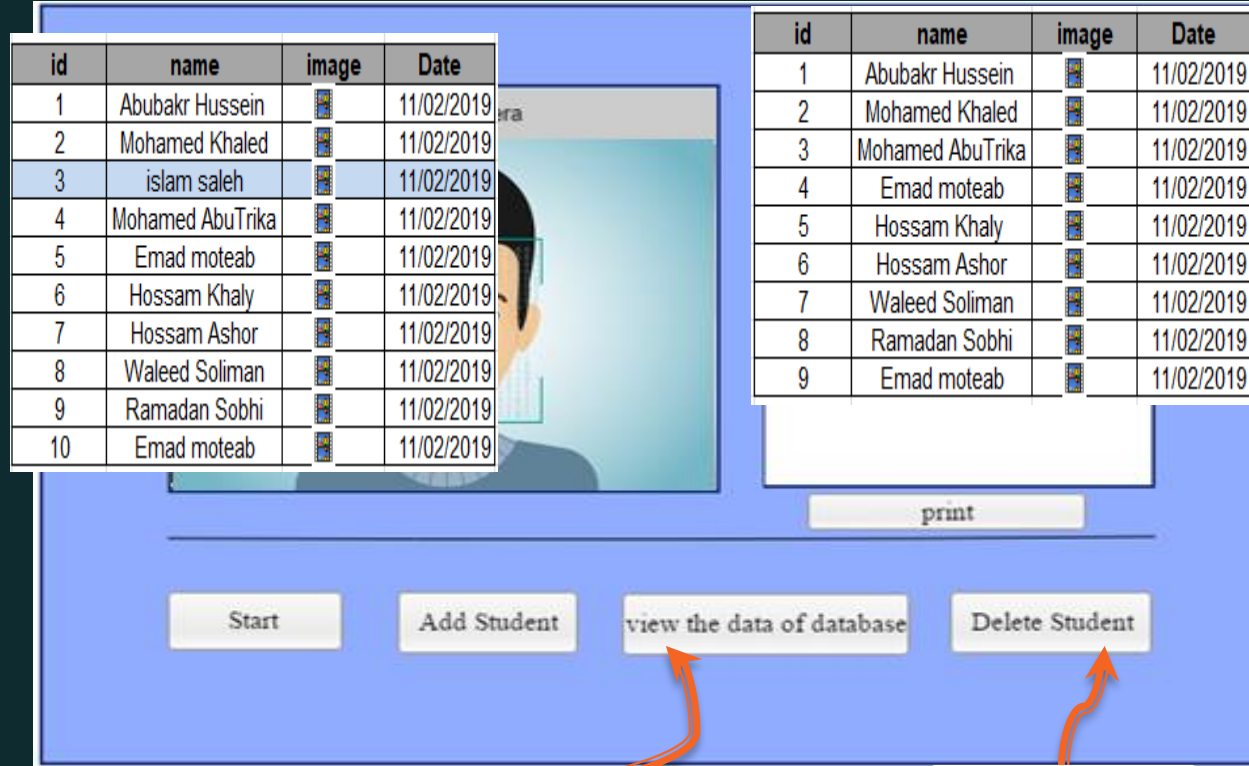


Prototype

- Add new student
- **Delete an Student**
- Print Attendance

id	name	image	Date
1	Abubakr Hussein		11/02/2019
2	Mohamed Khaled		11/02/2019
3	islam saleh		11/02/2019
4	Mohamed AbuTrika		11/02/2019
5	Emad moteab		11/02/2019
6	Hossam Khaly		11/02/2019
7	Hossam Ashor		11/02/2019
8	Waleed Soliman		11/02/2019
9	Ramadan Sobhi		11/02/2019
10	Emad moteab		11/02/2019

When the user want to add a new student in the database



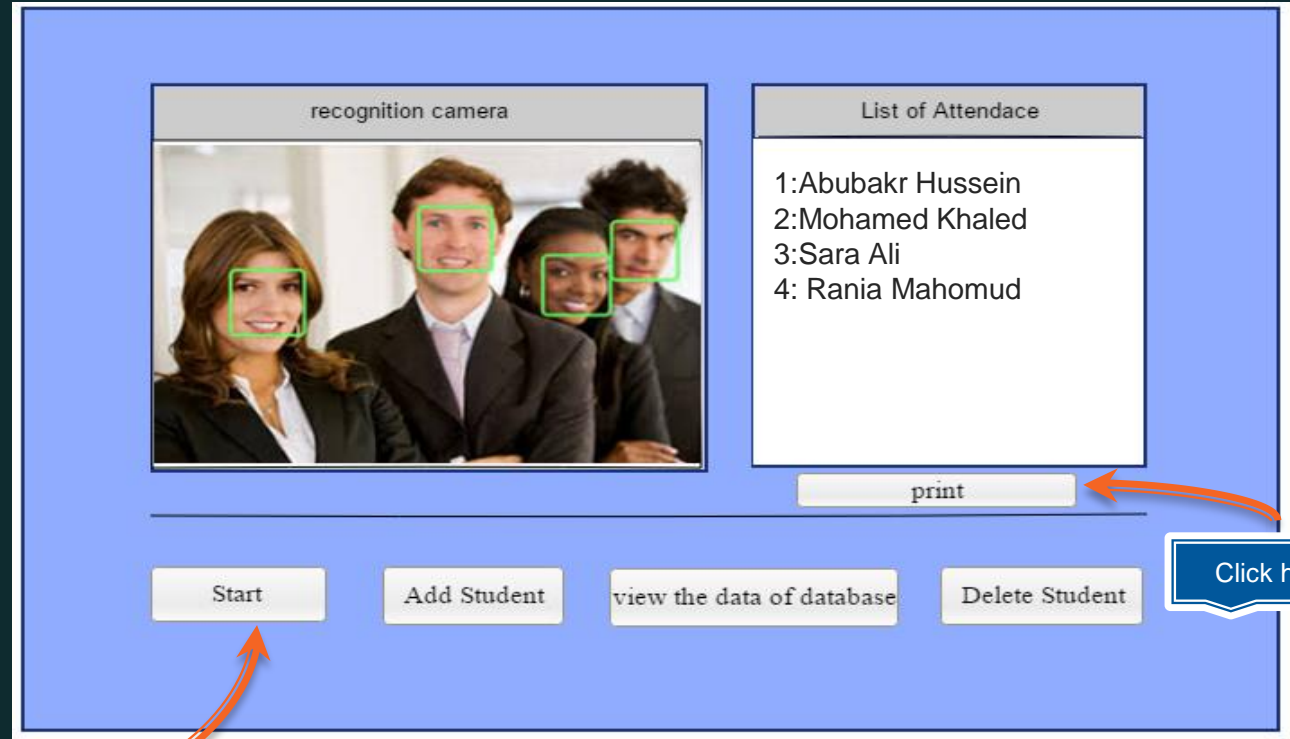
Click here

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Prototype

- Add new student
- Delete an student
- **Print Attendance**

When the user want to print the attendance



Prototype

- Add new student
- Delete an student
- **Print Attendance**

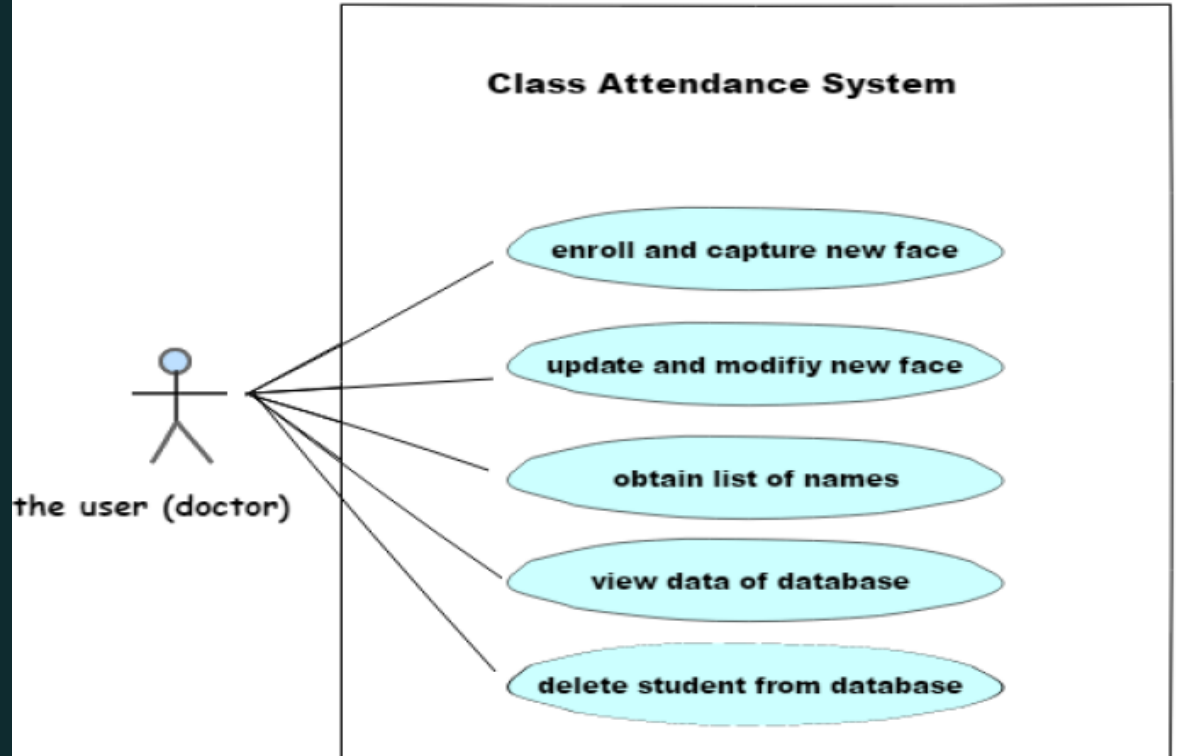
Attendance Excel Sheet

id	name	date
1	Abubakr Hussein	11/02/2019
2	Mohamed Khaled	11/02/2019
3	islam saleh	11/02/2019
4	Mohamed AbuTrika	11/02/2019
5	Emad moteab	11/02/2019
6	Hossam Khaly	11/02/2019
7	Hossam Ashor	11/02/2019
8	Waleed Soliman	11/02/2019
9	Ramadan Sobhi	11/02/2019
10	Emad moteab	11/02/2019
11	Mohamed AbuTrika	11/02/2019
12	Mohamed Salah	11/02/2019
13	Mahmoud Trizige	11/02/2019
14	Mohamed AbuTrikal	11/02/2019
15	Mohamed Barakat	11/02/2019
16	Saleh Gomaa	11/02/2019
17	Naser Maher	11/02/2019
18	Waleed Azaro	11/02/2019
19	Sherif Ekramy	11/02/2019
20	Ali Malool	11/02/2019

Software Design

- Use case
- Sequence diagrams
- Class diagram
- ERD
- Database

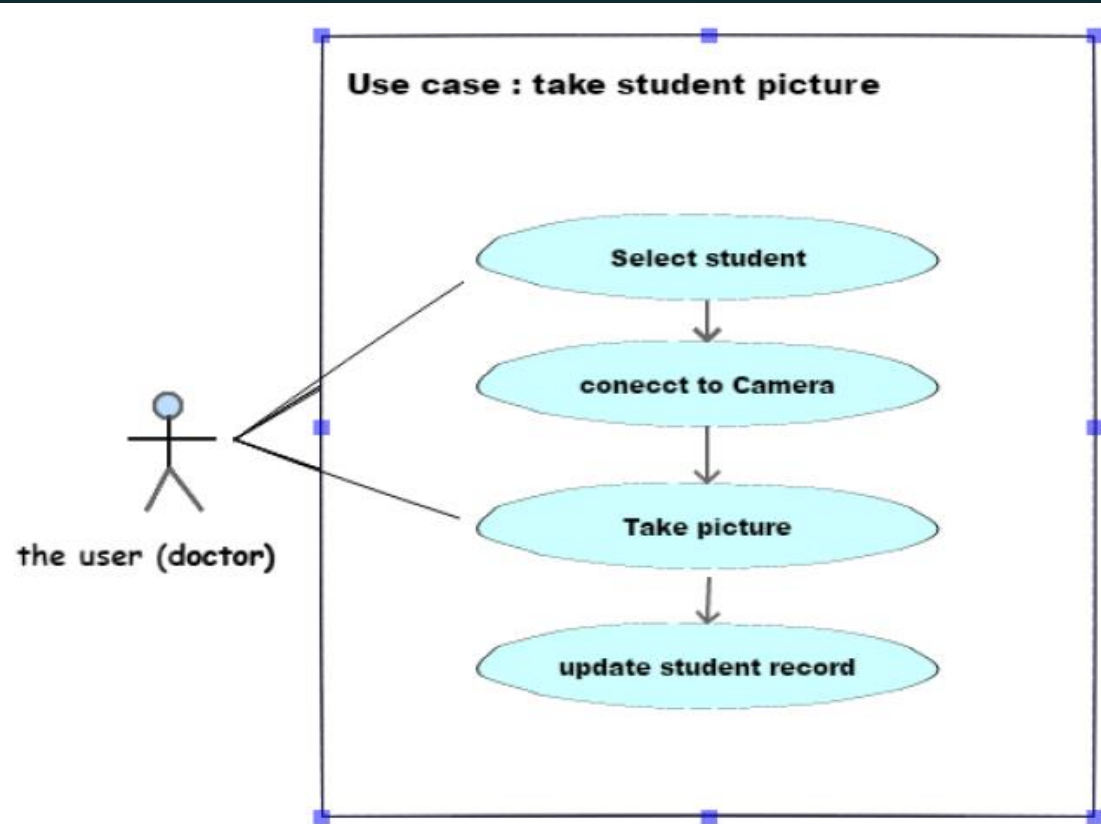
Class attendance system



Software Design

- **Use case**
- Sequence diagrams
- Class diagram
- ERD
- Database

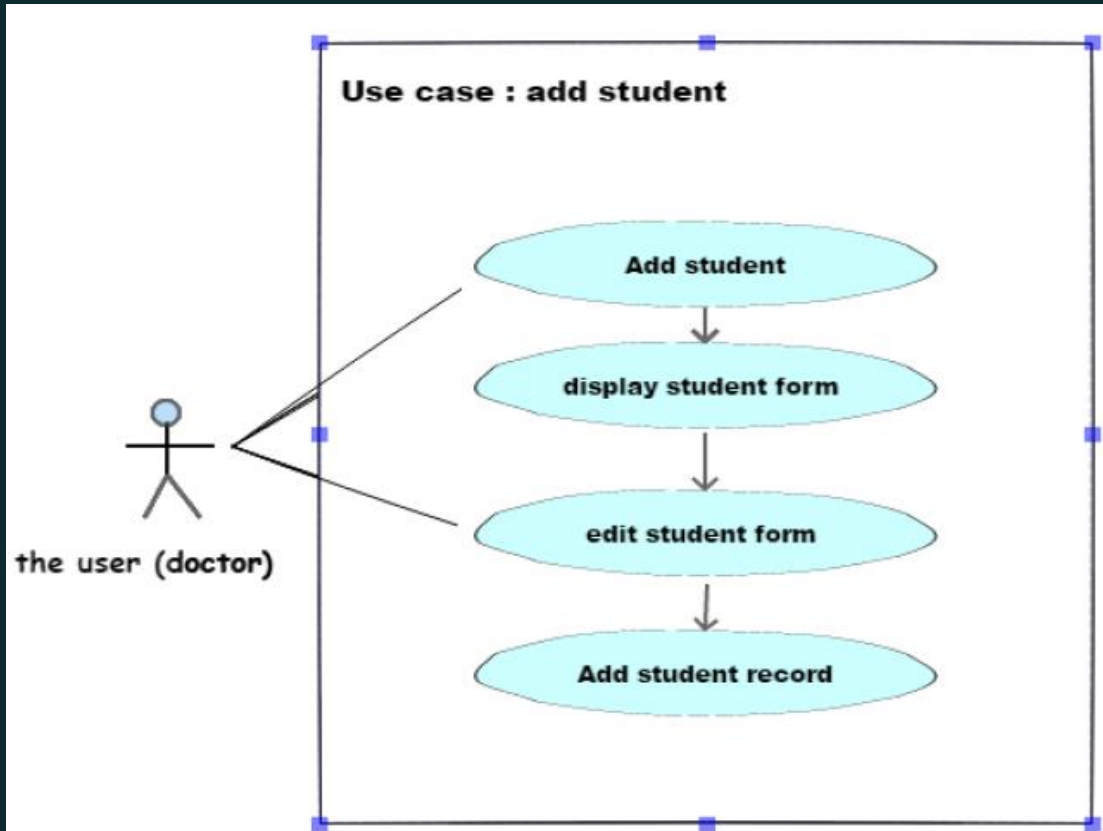
Capture new image



Software Design

- Use case
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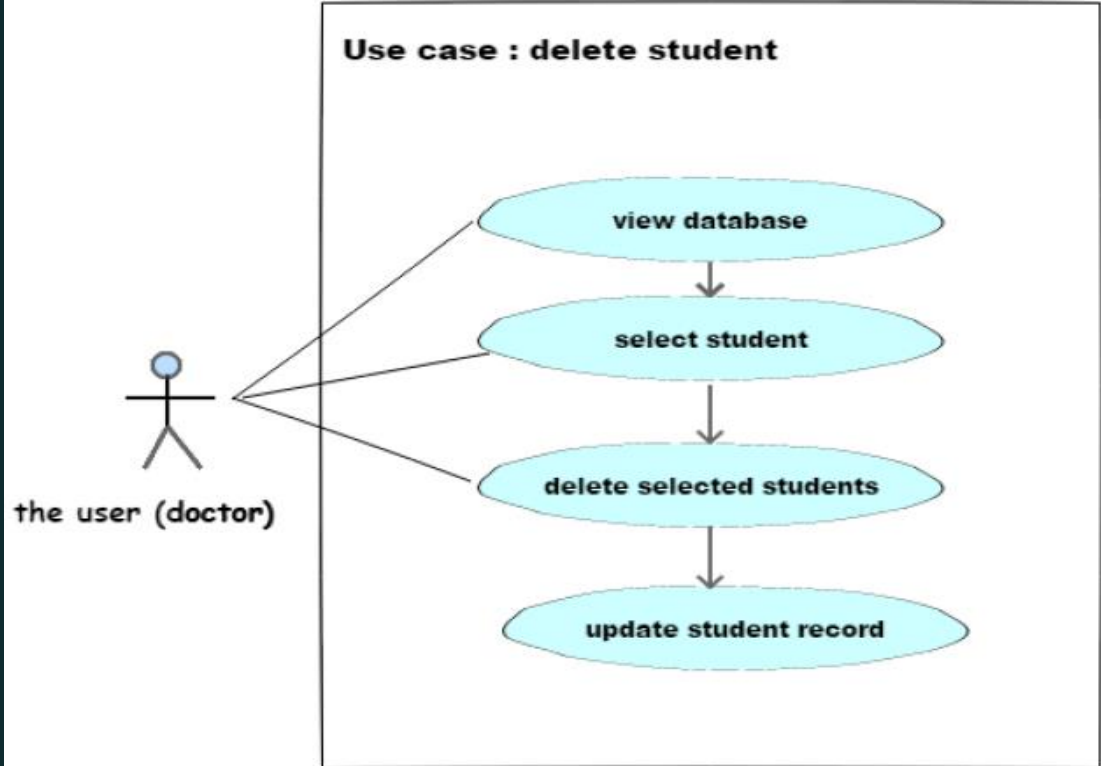
Add student



Software Design

- **Use case**
- Sequence diagrams
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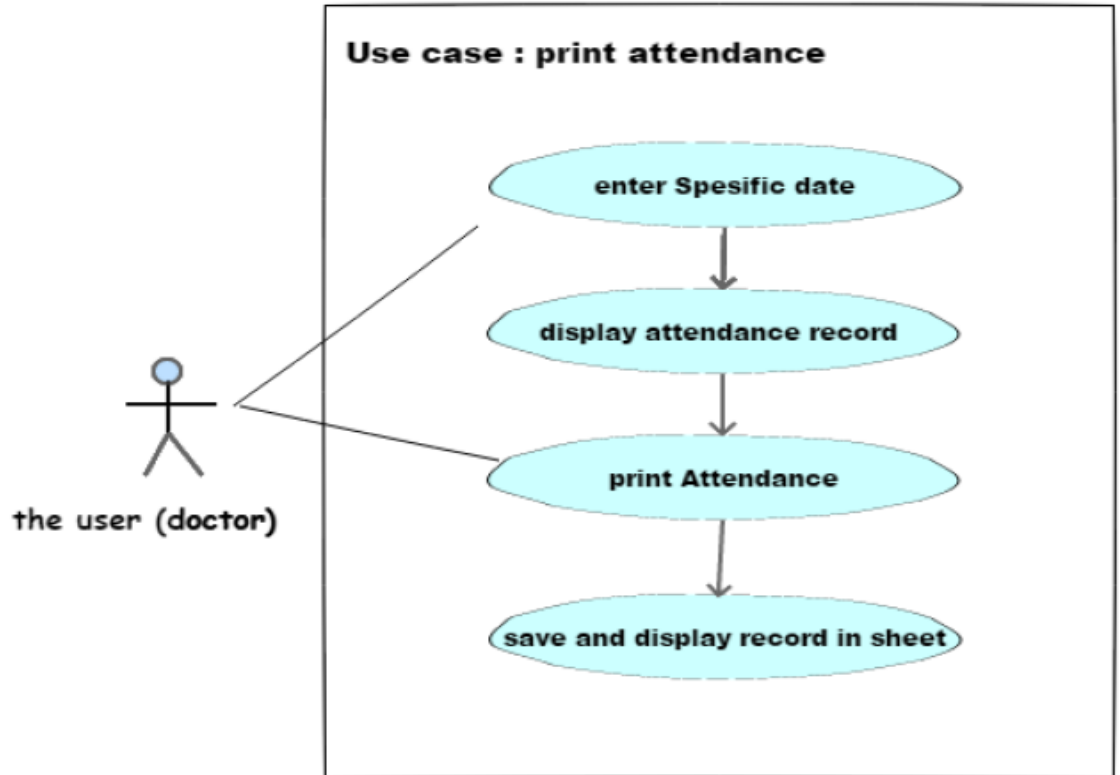
Delete student



Software Design

- **Use case**
- Sequence diagrams
- Class diagram
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- Database

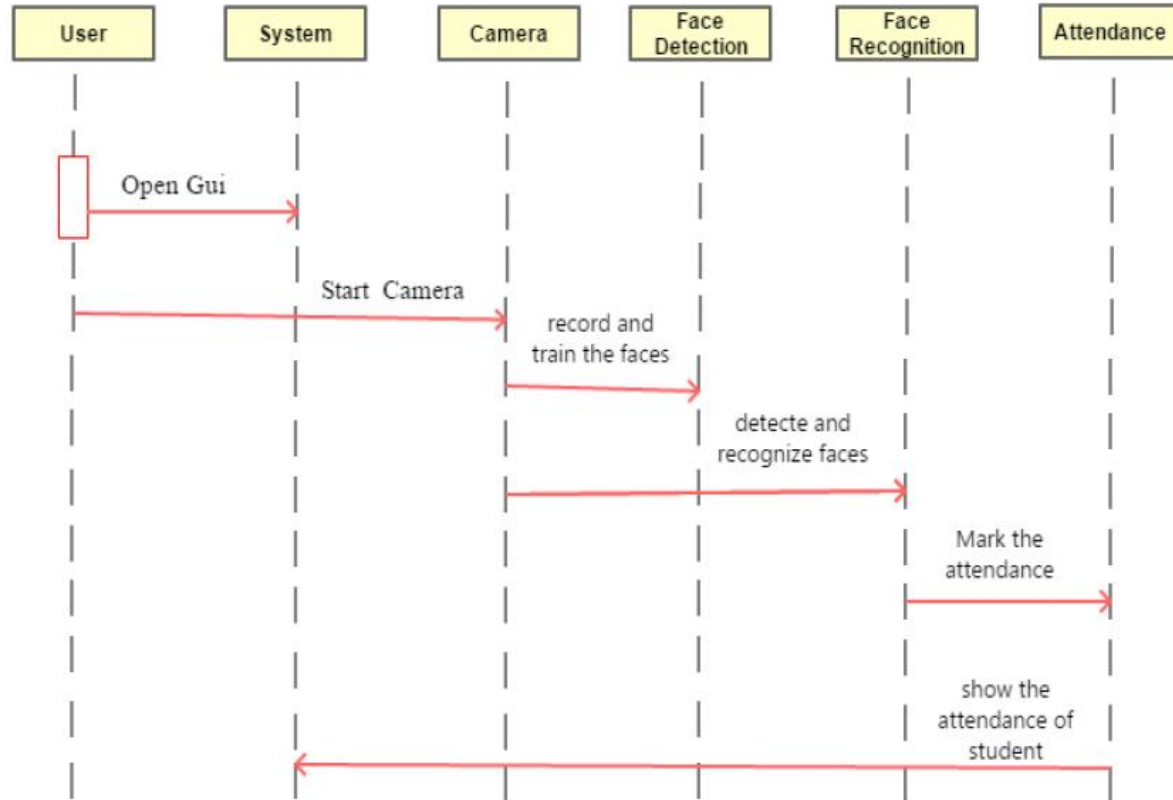
Print attendance



Software Design

- Use case
- **Sequence diagrams**
- Class diagram
- ERD
- Database

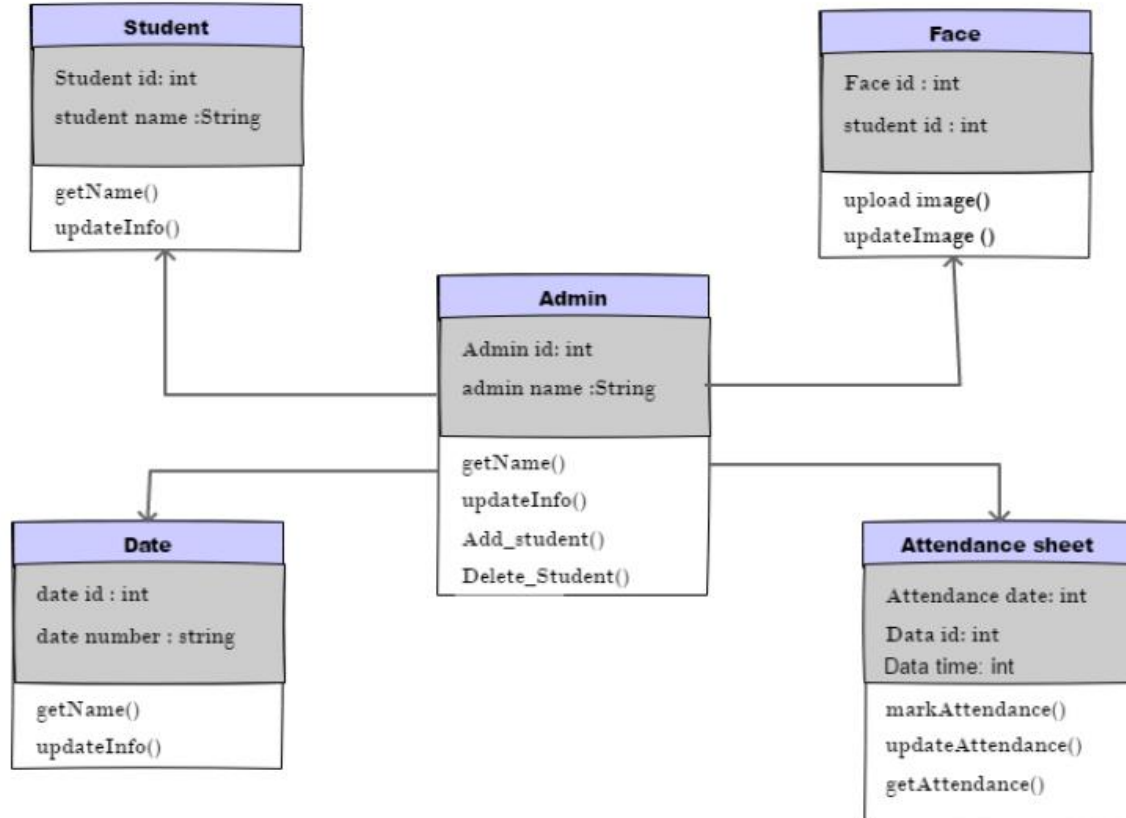
Sequence diagrams



Software Design

- Use case
- Sequence diagrams
- **Class diagram**
- ERD
- Database

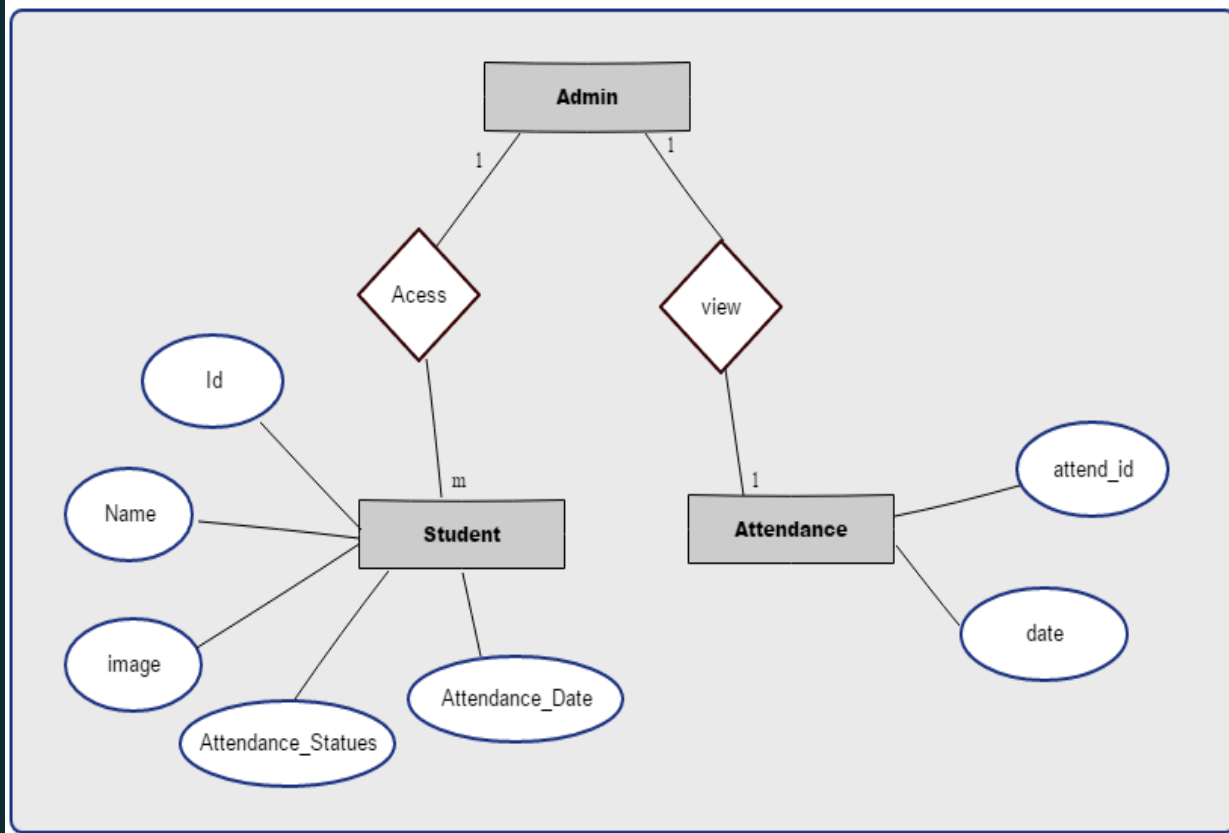
Class diagram



Software Design

- Use case
- Sequence diagrams
- Class diagram
- **ERD**
- Database

Entity Relationship Diagram (ERD)



Software Design

- Use case
- Sequence diagrams
- Class diagram
- ERD
- **Database**

Database:

TableName: Student

S.No	Column Name	Data type	constraint	Description
1	Student_Id	Int (5)	Primary key	Student id number
2	Name	Varchar2(20)	Not Null	Name of student
3	Image	.pgm(100)	Size must be of 11 kb	Images of students
4	Attendance_Status	Varchar2(7)	Present or absent	Attendance of students
5	Attendance_date	Date(10)	Not Null	Date of attendance

Software Design

- Use case
- Sequence diagrams
- Class diagram
- ERD
- **Database**

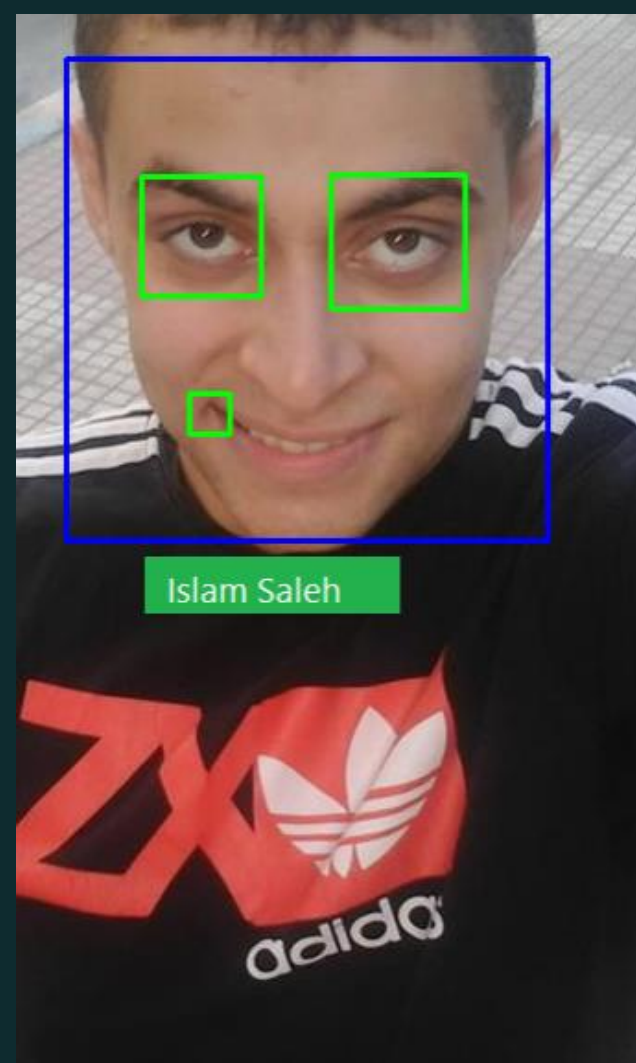
Database:

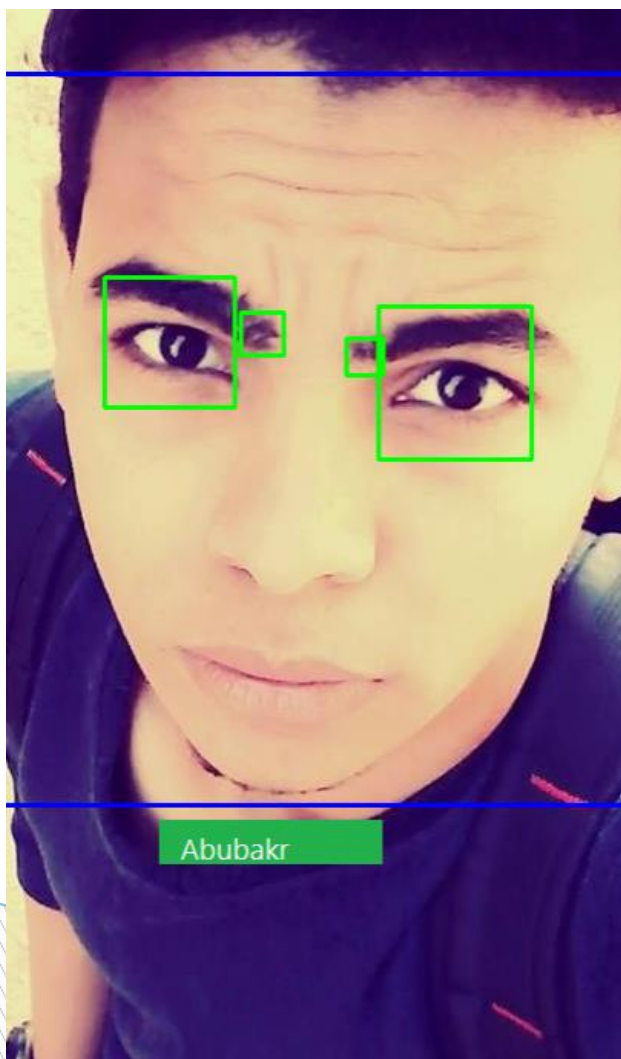
TableName: Attendance

S. No	Column Name	Data type	Constraint	Description
1	Attendance_Id	Int (5)	Primary key	Student id number
2	Date	Date(20)	Not Null	Number of date

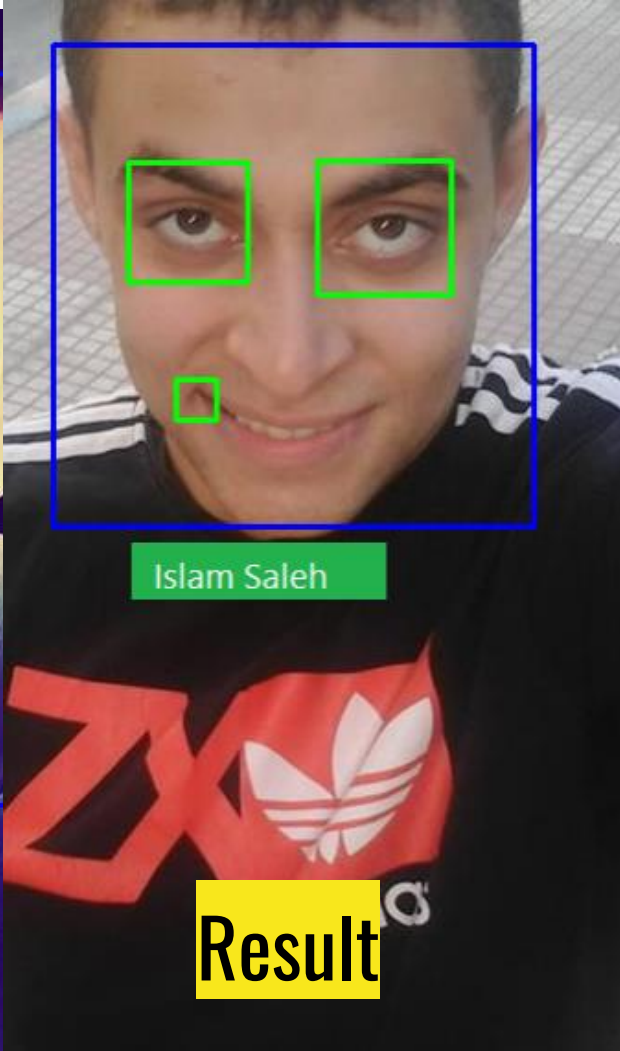
Results and conclusion

- A general face recognition software conducts a comparison of these parameters to the images in its database. Depending upon the matches found, it determines the result.
- This technique is known as feature based matching and it is the most basic method of facial recognition.



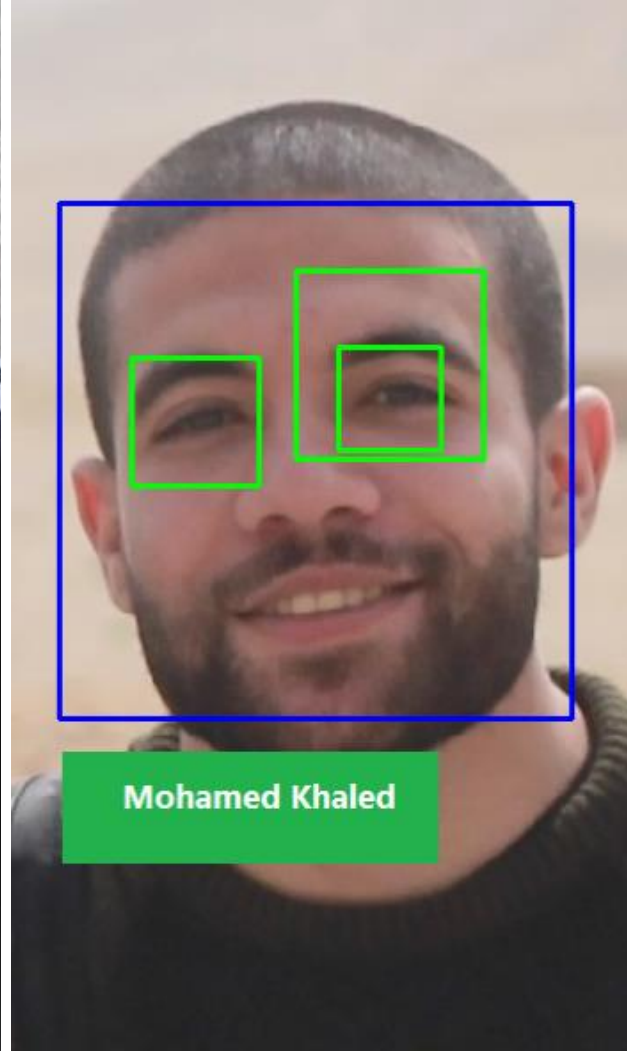


Abubakr



Islam Saleh

Result



Mohamed Khaled

Thanks