

Kingdom of Saudi Arabia  
Royal Commission at Yanbu  
Colleges & Institutes Division

Yanbu University College  
Computer Science & Engineering Dept.  
Information & Computer Technology Dept.



المملكة العربية السعودية  
بنيان المدينة المنورة  
قطاع الكليات والمعاهد  
كلية بنيان الجامعة  
قسم علوم وهندسة الحاسب الآلي  
قسم تقنية المعلومات والحاسب الآلي

## PROJECT

ACADEMIC YEAR 1442/1443 H (2021/2022 G), SEMESTER II (212)

# ARTIFICIAL INTELLIGENCE CS 331

DATE:	Tuesday, February 1, 2022	START TIME:	Week 05
		FINISH TIME:	Week 15

STUDENT NAME:	_ AYA ALHARBI																			
STUDENT ID:	<table border="1"><tr><td>3</td><td>8</td><td>2</td><td>0</td><td>1</td><td>2</td><td>3</td><td></td><td></td><td></td></tr></table>								3	8	2	0	1	2	3				SECTION:	<u>1</u>
3	8	2	0	1	2	3														

FOR INSTRUCTOR USE ONLY	GENERAL INSTRUCTIONS
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Q. No.	CLOs	MAX MARK	MARKS OBTAINED	<ul style="list-style-type: none"><li>Write your name and I.D. number in the space provided above.</li><li>Support materials are not allowed in the examination Hall except those provided by instructor.</li><li>Do not use digital or printed dictionary.</li><li>Do not use pencils for answering except for drawing.</li><li>Read each question carefully before answering.</li><li>Number shown on the right-hand side against each question is the mark allocated.</li></ul>
Q1	3.01	10		
Q2	3.01	10		
Q3	3.01	10		
Q4	3.01	10		
Q5	3.01	05		
TOTAL MARKS		45		

<b>MARKED BY:</b>	<b>Signature:</b>
<b>CHECKED BY:</b>	<b>Signature:</b>

## Project Cover Paper

At the end of this course student is supposed to submit a course project, it has 15% marks in overall evaluation.

### **First phase (Week 5)**

1. Student is supposed to present the idea of project.
2. Student can choose a research project or an AI application.  
Each group of students need to explain the functional features of their application, in case of a research project student need to explain the problem, application of proposed research language or methodology to implement the research.  
The mode of submission is in terms of a presentation.

### **Second phase (Week 7 )**

3. Student will submit the description of proposed application with the details of all features.  
Also, each group member will describe the agent type and information of PEAS for the proposed application.

For research project students need to submit the literature review for their proposed study. Student is supposed to give ten references from the latest research of 2017-2022

The mode of submission will be the hardcopy in the course dedicated google drive.

### **Third phase (Week 9)**

4. During this phase student will show the interfaces of the application. Also they will discuss the searching algorithms used in the design of application.

For research project students supposed to talk about its framework or model during the presentation.

The mode of submission is the presentation.

#### **Fourth Phase (Week 15)**

5. Students will present the complete application with all functionalities.  
For research work students is supposed to present the complete research with at least twenty five recent references.

6. Finally, student will submit the report that will include the details of all the above phases.

Presentation and code of applications are supposed to add as Appendixes.

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## **1. Introduction**

### **1.1 Problem:**

There is a problem while preparing students and this problem is the reason why students are late for their lessons and the reason for wasting time. Also, due to the different nationalities, errors occur in the pronunciation of names. So we created a Face ID feature.

### **1.2 Solution:**

With the Face ID system, students' attendance will be recorded according to the face through the camera. It will identify the face image, the image may show the person looking straight ahead, facial features will be recognized from the image, and facial recognition can help verify the identity of the person and record their presence in the system.

### **1.3 Goals:**

We have created this feature to achieve some goals, such as: First, it is easy to track student attendance. Second, faster processing of the preparation process. Third, more comfort because it is a better alternative than writing on paper, which takes a lot of time.

#### **1.4 PowerPoint presentation:**

On the first phase, we presented the idea of the project, talked about what is face ID, mentioned its features and presented its functions.

**project name face ID**



# introduction

Face id is a technology system. It uses a biometric facial recognition system to identify facial features from a photograph or video clip. It compares the information to a database of known faces to find a match. Face recognition can help verify a person's identity and record their data



## Features

- 1- Easy of tracking students attendance
- 2- Faster processing
- 3.-Greater comfort

# Functionality

Know the number of attendance and absence at the class

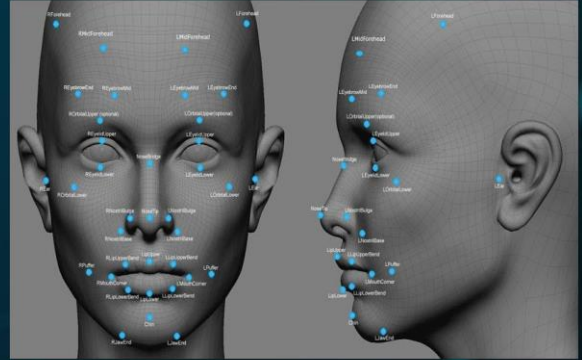
How does face id technology work?

Step 1: Discover the face

Step 2: Facial analysis

Step 3: Convert image to data

Step 4: Find the matcher



## 2. Project Description

### 2.1 Idea:

It is a camera that prepares the students in class instead of the teacher setting it up. This process depends on capturing the student's photo and requires that the face be directly on the camera. How it works: The student points the laptop camera and then takes a picture of the face, then sends it to the system and then the preparation is done.

### 2.2 PEAS & Agent:

Agent	Performance Measurement	Environment	Actuators	Sensors
Agent name Face ID	The system can identify the faces of different individuals.	Laptop camera	On the camera in the laptop	Detecting faces and preparing students.
Agent type Camera Laptop	Identifying the faces of individuals	Internet	Steering the camera on the face	----- ----
----- -----	Good performance	students	----- -----	----- ----
----- -----	safety	class	----- -----	----- ----

## 3. Methodology

### 3.1 Python language:



We chose the Python language in the Face ID project. It is one of the most dynamic and versatile programming languages available in the industry today. It is also a very fast language in the process of developing various applications. This language has many advantages, including

**1- Easy to program:**

Applications can be programmed easily because the Python language is easy to learn and apply.

**2- Wide range of libraries:**

The Python language features a large number of libraries that help in application programming. It can also make it easier for us to write codes. We have chosen the CV2 library which is a proprietary library in the open- source Face ID.

**3- GUI support:**

A graphical user interface or graphical user interface is one of the key aspects of any programming language because it has the ability to add a twist to the code and make the results more visible.

**3.2 libraires:**

**OpenCV:**

OpenCV is a huge open-source library for computer vision, machine learning, and image processing. It can process images and videos to identify objects, faces, or even the handwriting of a human. This OpenCV tutorial will help you learn the Image-processing from Basics to Advance, like operations on Images, Videos using a huge set of OpenCV programs and projects and cv2 is the module import name for OpenCV-python.

**3.3 Tools:**

**1-imgproc**

An image processing unit that includes linear and non-linear image filtering, geometric image transformations (scaling, affine warping and perspective, general table-based mapping), color space transformation, histograms, and other properties. An image processing unit that includes linear and non-linear image filtering, geometric image transformations (scaling, affine warping and perspective, general table-based mapping), color space transformation, histograms, and other properties.

**2- calib3d**

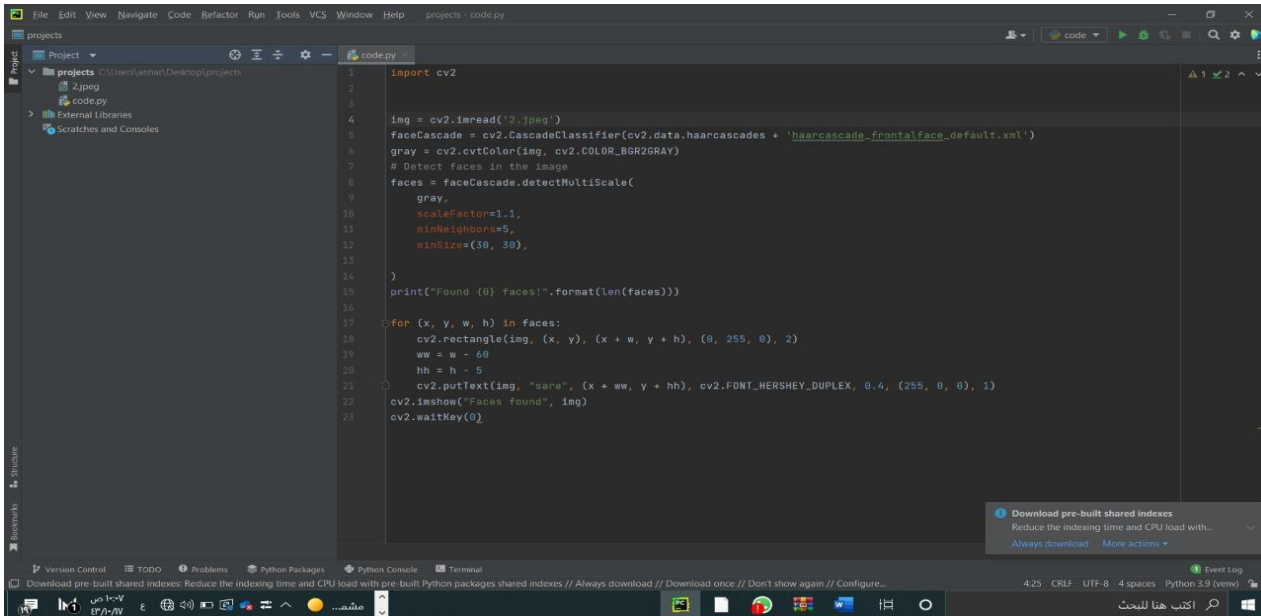
Multiple view basic geometry algorithms, single and stereo camera calibration, object pose estimation, stereo correspondence algorithms, and 3D reconstruction elements.

**3- objdetect**

Detect faces and states from predefined categories (eg, faces, eyes, cups, people, cars, and so on).

## 4. Code algorithm

### 4.1 image algorithm:



**imread:** algorithm reads the image you saved.

**haarcascade:** the algorithm works to identify the face in the image.

**frontalface\_default.xml:** This is a trainee's file before that on the facial identification data. I mean, instead of writing a new code, this trainee file is working on facial identification for a person looking at the front side, meaning if you give him pictures of a person looking to the right and left, he will not be able to do face identification because it is for pictures of a person looking at the front side only.

**cvtColor:** Algorithm converts the image from a color image to a gray image so that the algorithm can identify the face in the image.

**detectMultiScale:** Algorithm determines the image of more than one face.

**rectangle:** Algorithm draws a rectangle on the image to determine the face.

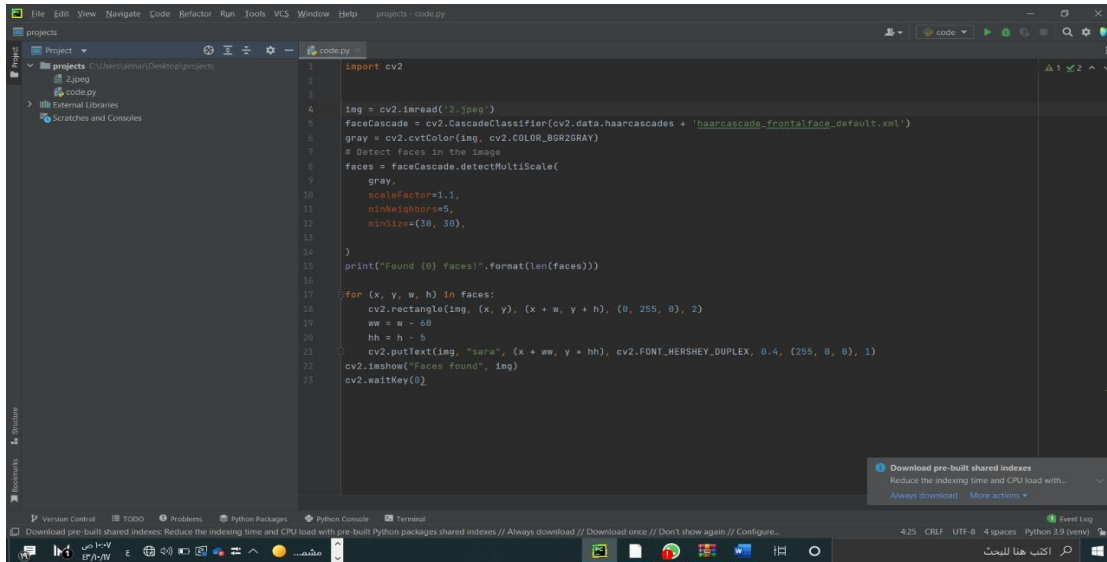
**PutText:** Algorithm puts a name under the picture.

## 5. project code

## 5.1 code & output:

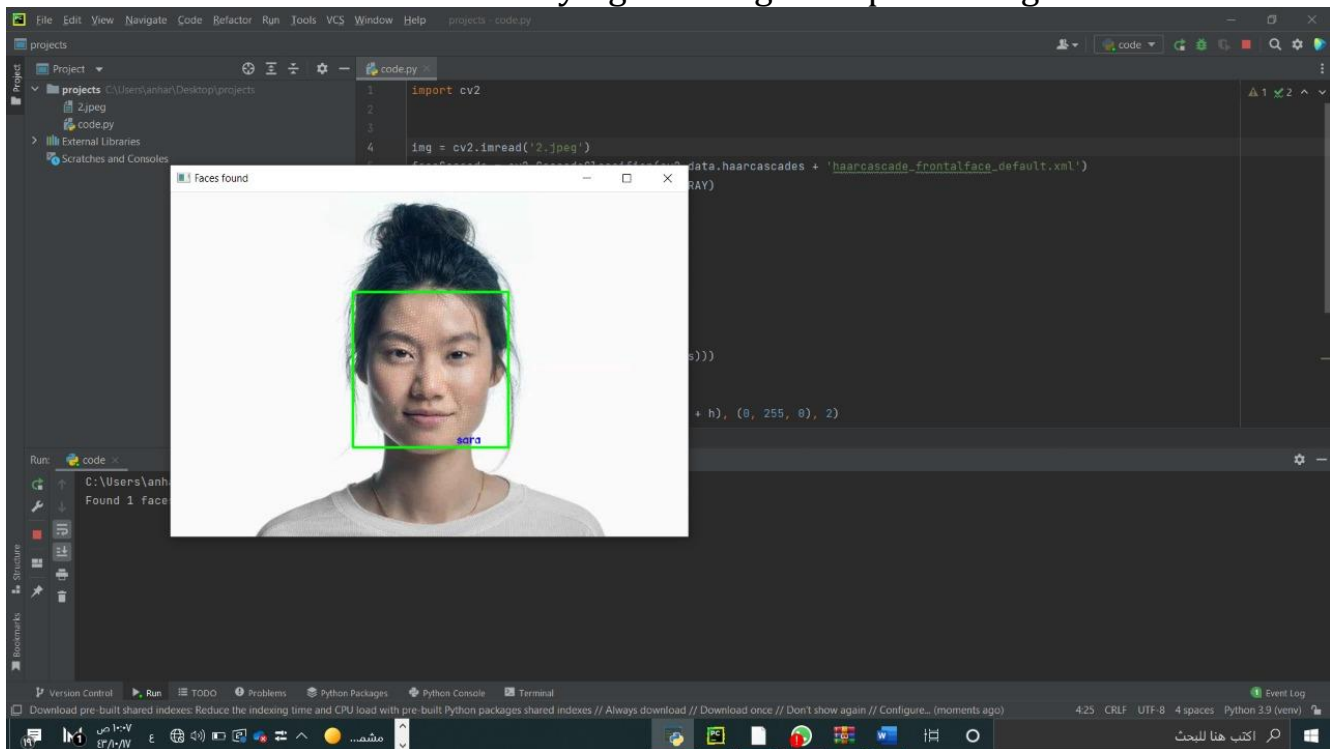
Face ID is a branch of computer vision that studies and processes images to identify living organisms such as humans.

In this project, we will display an image and the code will identify the identity and what is its name, and also must look at the camera directly in order to be recognized

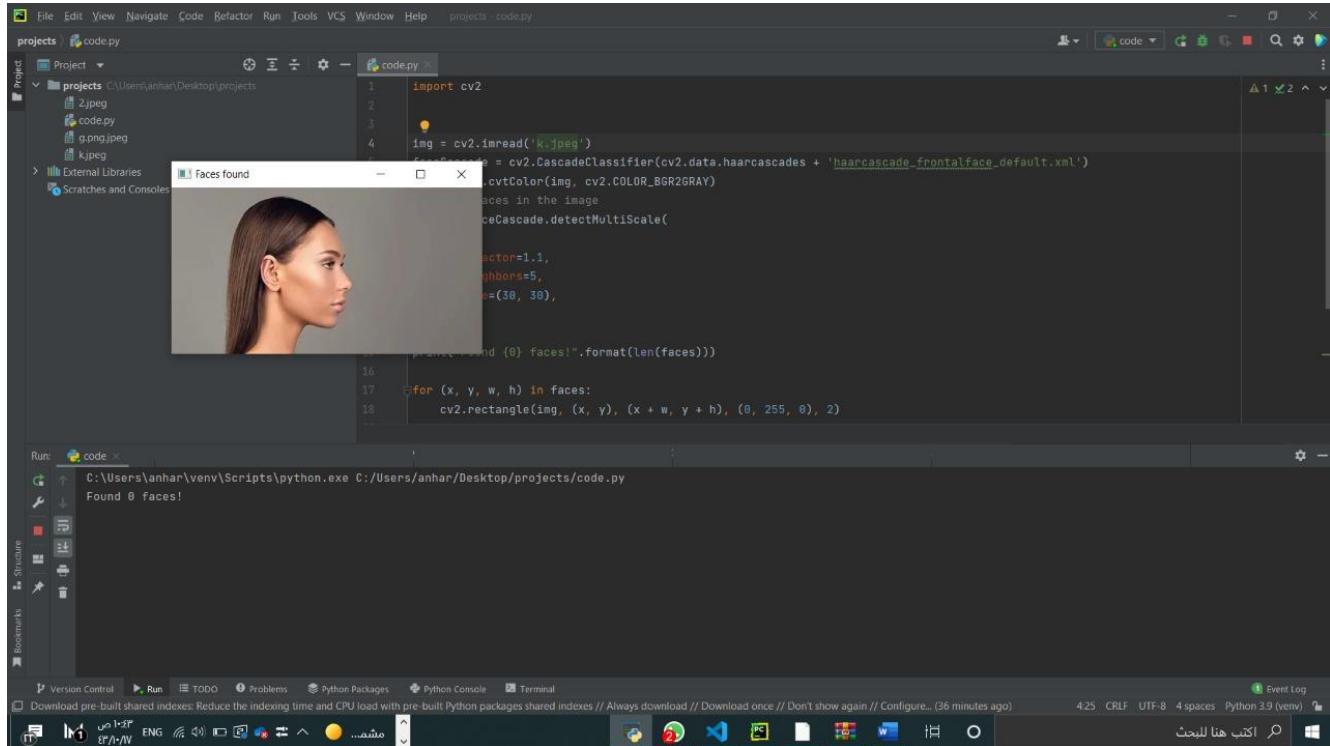


```
1 import cv2
2
3
4 img = cv2.imread('2.jpeg')
5 faceCascade = cv2.CascadeClassifier(cv2.data.harcascades + 'haarcascade-frontalface-default.xml')
6 gray = cv2.cvtColor(img, cv2.COLOR_BGR2GRAY)
7 # Detect faces in the image
8 faces = faceCascade.detectMultiScale(
9     gray,
10    scaleFactor=1.1,
11    minNeighbors=5,
12    minSize=(30, 30),
13)
14
15 print("Found {} faces!".format(len(faces)))
16
17 for (x, y, w, h) in faces:
18     cv2.rectangle(img, (x, y), (x + w, y + h), (0, 255, 0), 2)
19     ww = w * 0.8
20     hh = h * 0.8
21     cv2.putText(img, "sara", (x + ww, y + hh), cv2.FONT_HERSHEY_DUPLEX, 0.4, (255, 0, 0), 1)
22 cv2.imshow("Faces found", img)
23 cv2.waitKey(0)
```

the identity of the image was identified because it was directed at the camera, and her name was Sarah after studying the image and processing it in the code:



Here the code could not detect the image because the image was not directed to the camera:



## 6. References & conclusion

### **6.1 Reference:**

<https://hackr.io/blog/python-programming-language>  
<https://opencv.org/about/>  
<https://en.wikipedia.org/wiki/OpenCV>  
<https://www.edureka.co/blog/python-features/>  
<https://www.javatpoint.com/face-recognition-and-face-detection- using-opencv>  
<https://pyimagesearch.com/2018/09/24/opencv-face-recognition/>  
<https://www.mygreatlearning.com/blog/face-recognition/>  
<https://stackoverflow.com/questions/678236/how-do-i-get-the-filename-without-the-extension-from-a-path-in-python>  
<https://realpython.com/face-recognition-with-python/>  
<https://pythonbasics.org/face-detection/>  
[https://docs.opencv.org/4.0.0/d7/d8b/tutorial\\_py\\_face\\_detection.html](https://docs.opencv.org/4.0.0/d7/d8b/tutorial_py_face_detection.html)

### **6.2 Conclusion:**

In conclusion, the face ID project was completed and the problems we faced in identifying the face were resolved. We have also learned how to design a programming code in Python for facial recognition in artificial intelligence.