

Module 3: Creating Solutions with Raspberry Pi and Sense HAT Board

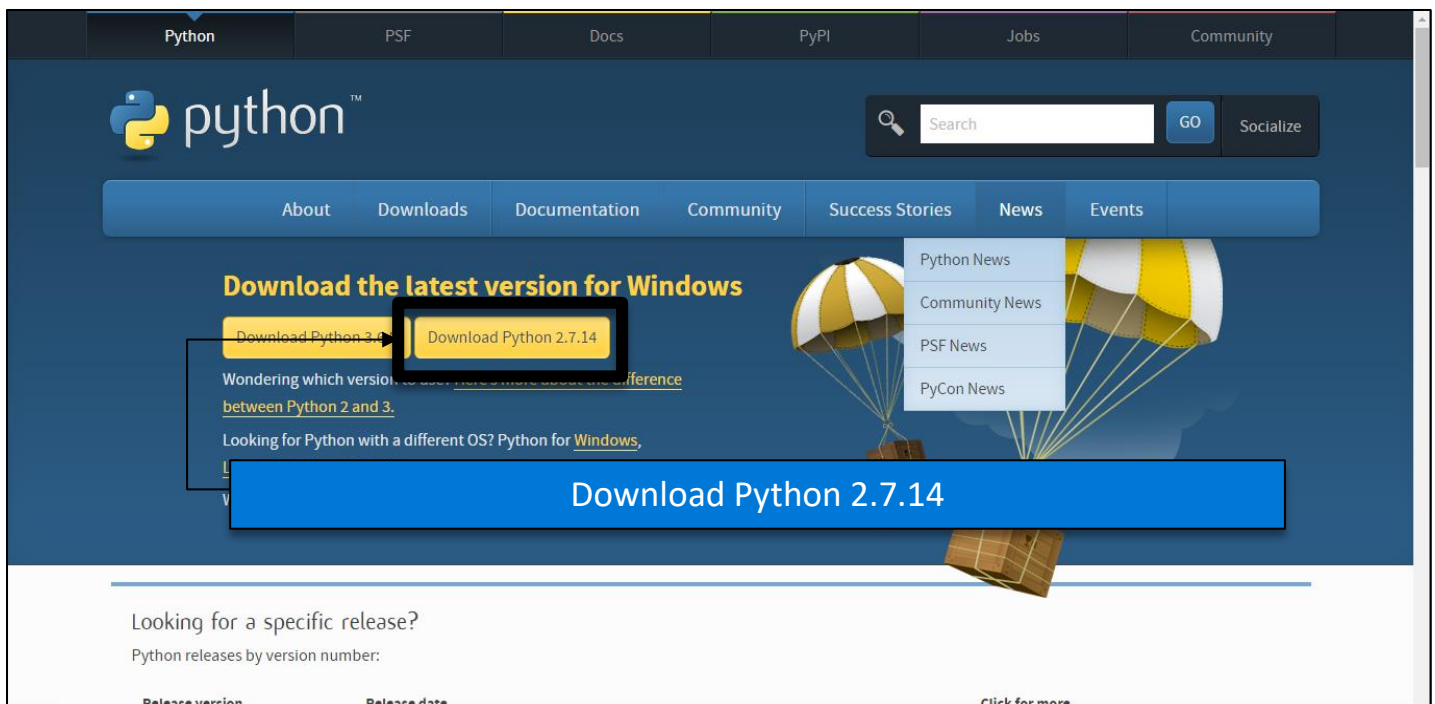
Demo

edureka!

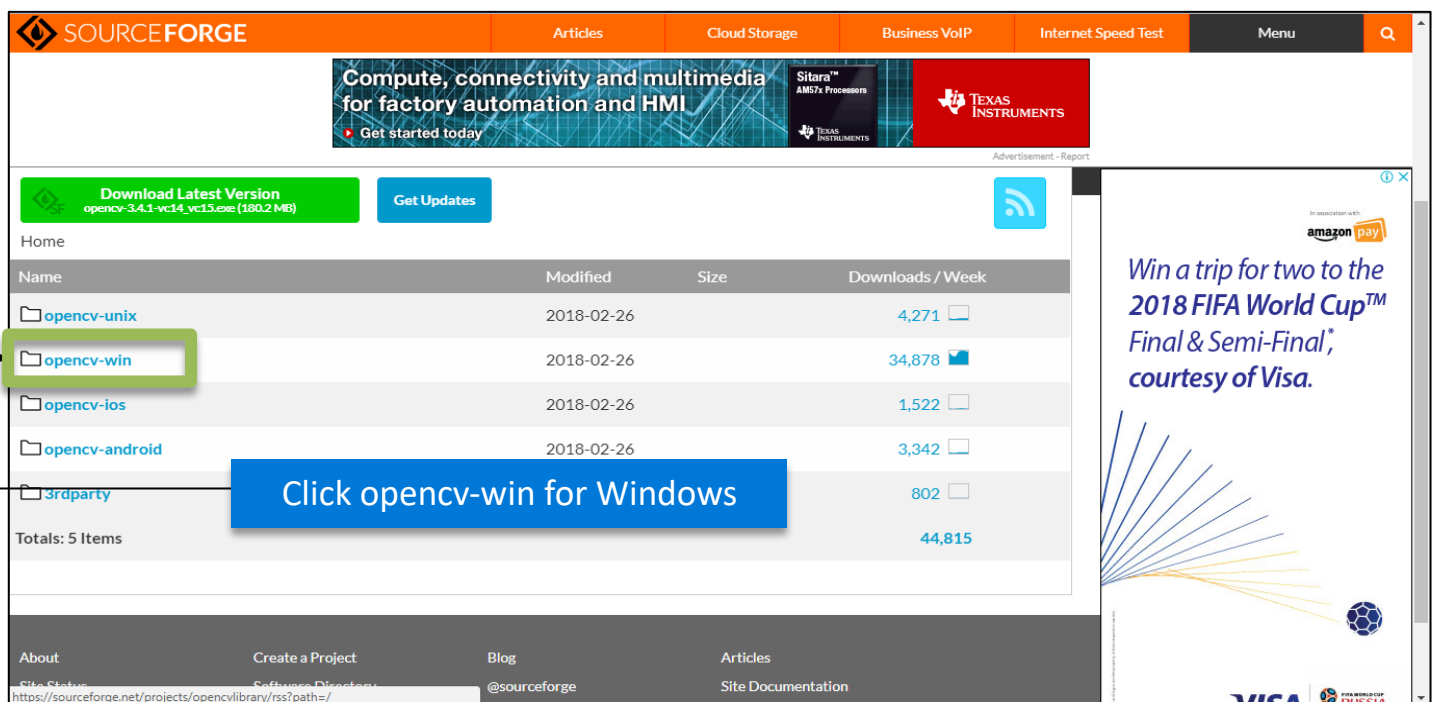
edureka!

➤ Face Recognition using Webcam

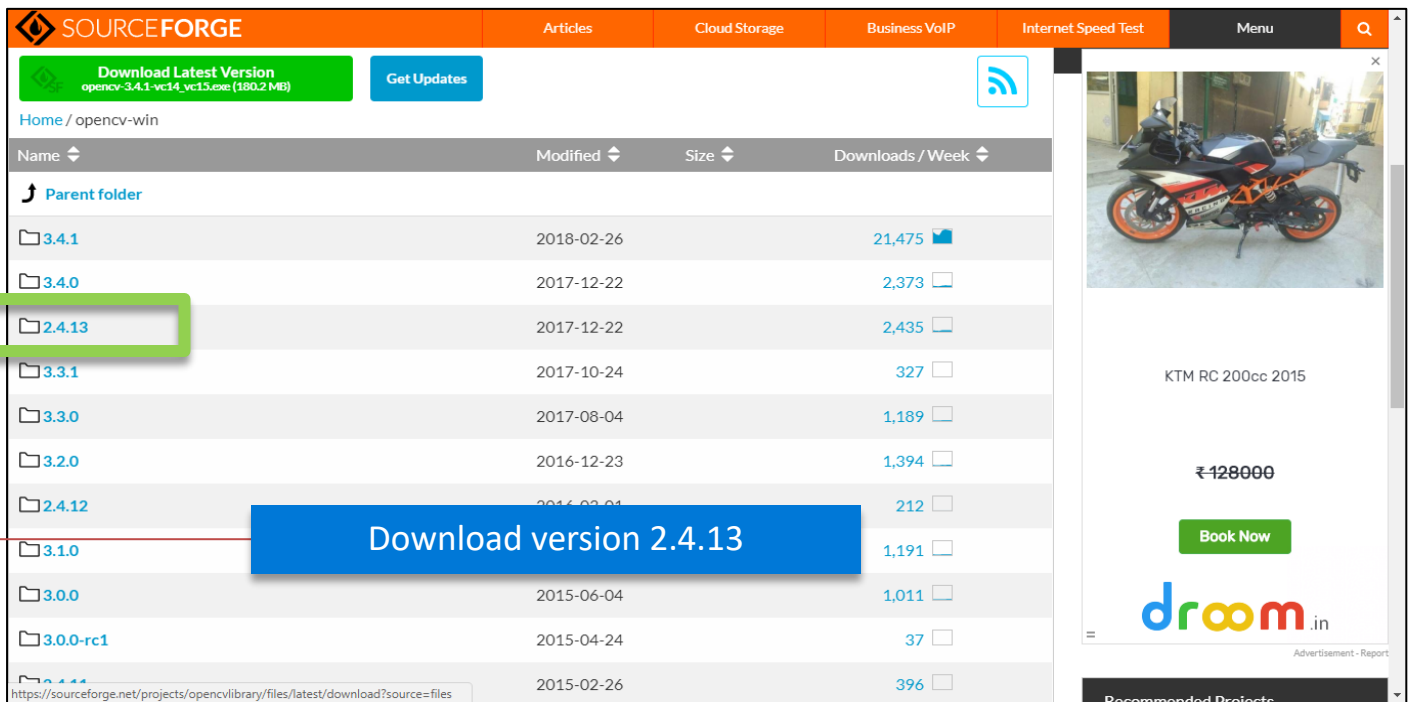
Step 1: Open the following link <https://www.python.org/downloads/> > Download Python 2.7



Step 2: Once download is finished install Python 2.7 > Open the following link <https://sourceforge.net/projects/opencvlibrary/files/> > Click opencv-win



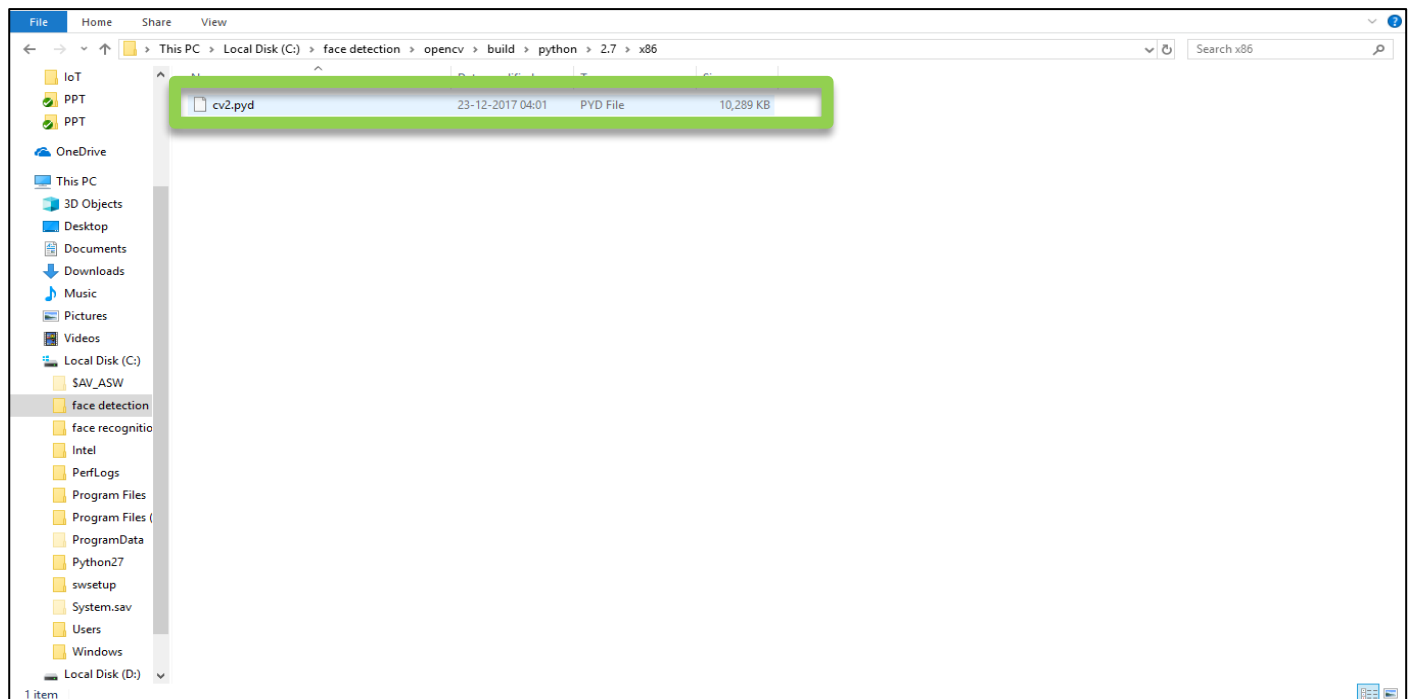
Step 3: Click and download OpenCV 2.4.13



The screenshot shows the SourceForge project page for OpenCV. At the top, there's a green button for 'Download Latest Version' and a blue 'Get Updates' button. Below, a table lists various versions of OpenCV. The version '2.4.13' is highlighted with a green box and a red arrow. A blue box with the text 'Download version 2.4.13' is overlaid on the table.

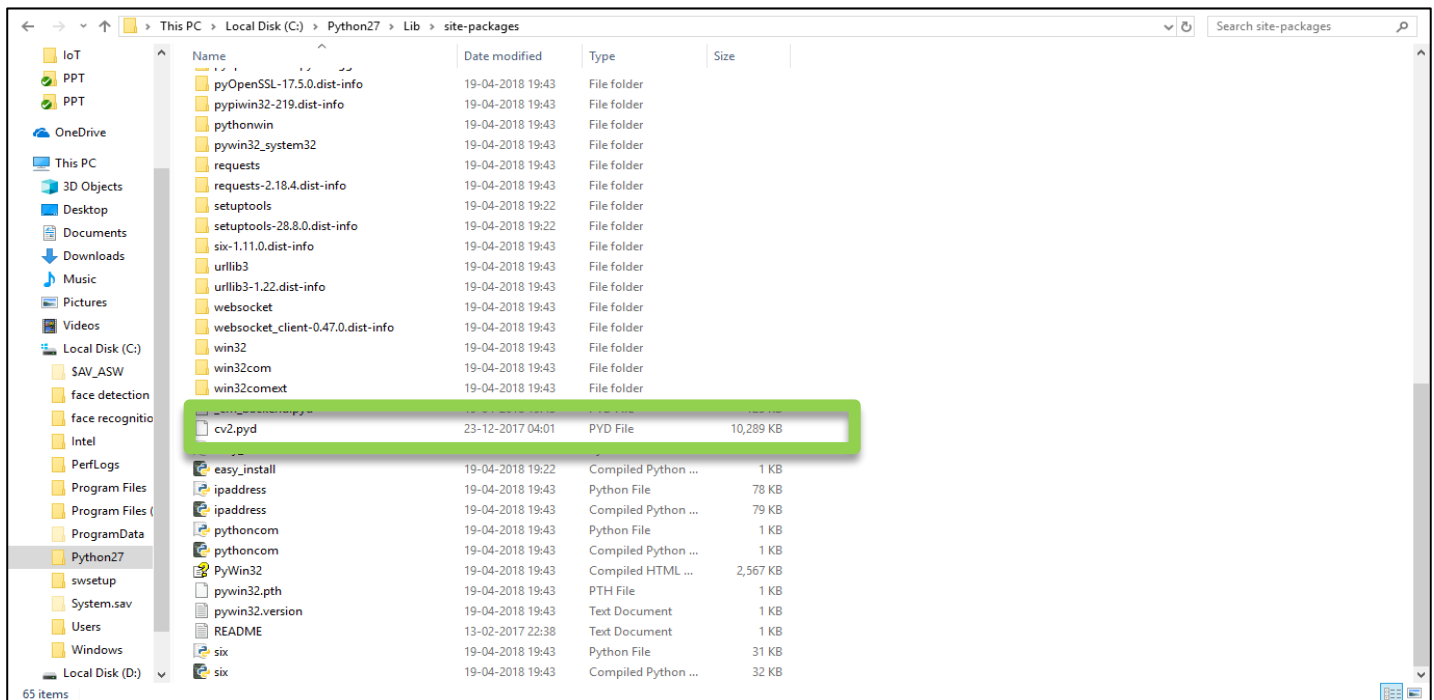
Name	Modified	Size	Downloads / Week
Parent folder			
3.4.1	2018-02-26		21,475
3.4.0	2017-12-22		2,373
2.4.13	2017-12-22		2,435
3.3.1	2017-10-24		327
3.3.0	2017-08-04		1,189
3.2.0	2016-12-23		1,394
2.4.12	2016-02-01		212
3.1.0	2015-06-04		1,191
3.0.0	2015-06-04		1,011
3.0.0-rc1	2015-04-24		37
2.4.11	2015-02-26		396

Step 4: Go the folder where OpenCV is downloaded. Go to build > python > 2.7 > x86 > Copy the cv2.pyd file

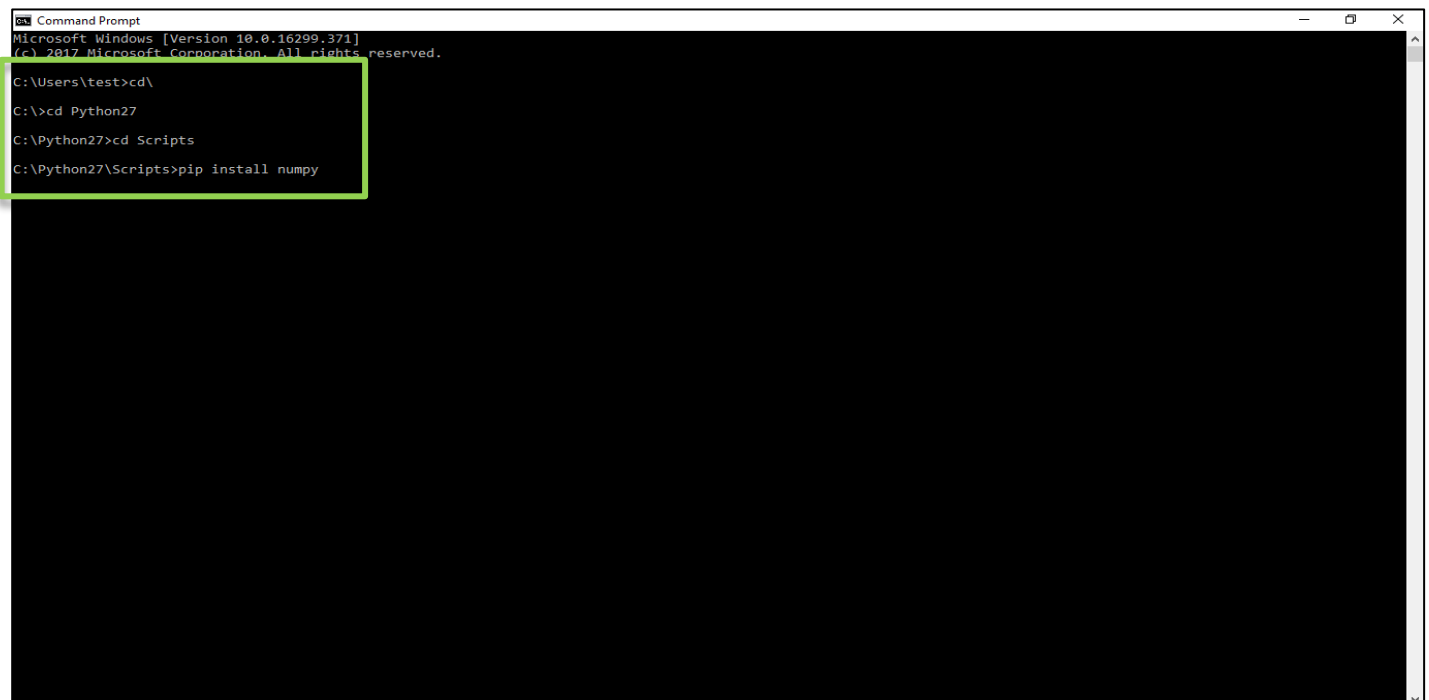


The screenshot shows a Windows File Explorer window. The address bar shows the path: 'This PC > Local Disk (C:) > face detection > opencv > build > python > 2.7 > x86'. The file 'cv2.pyd' is highlighted with a green box.

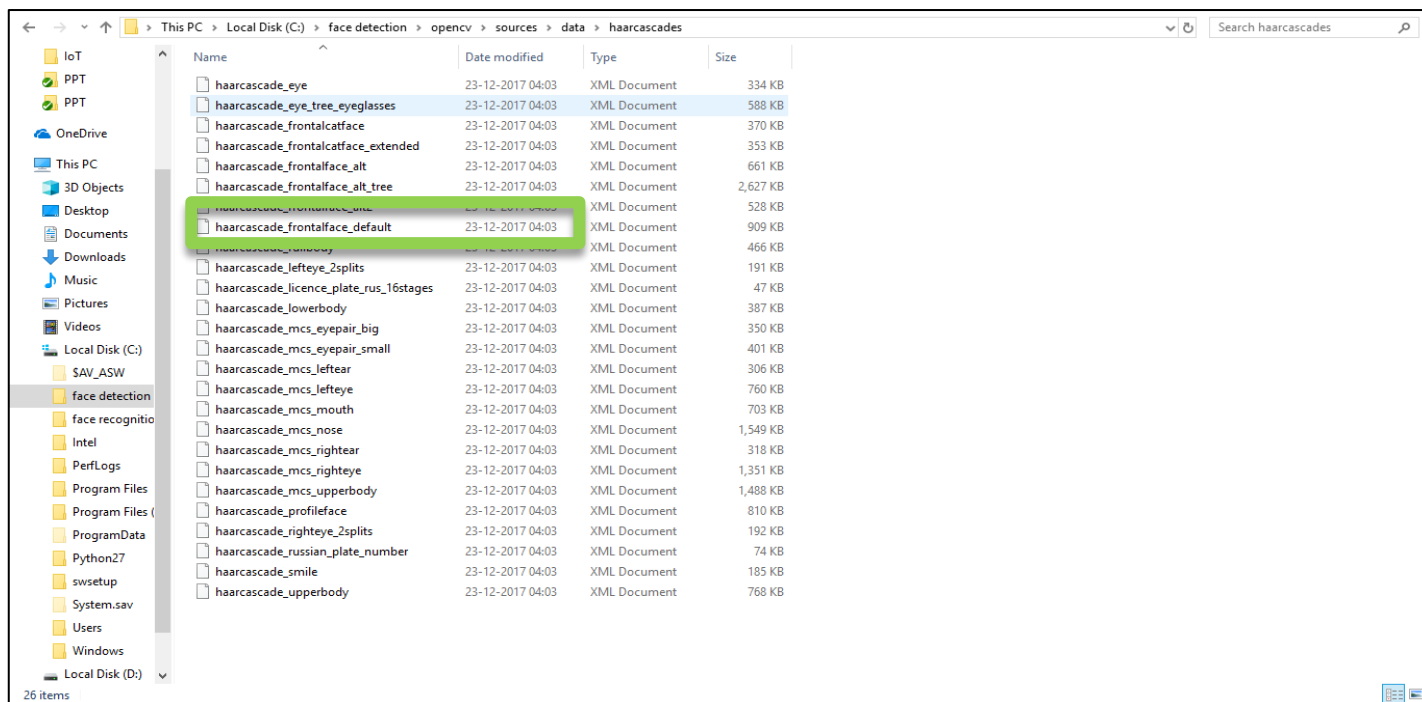
Step 5: Go the *Python27* folder (Folder where Python is downloaded) > Go to lib> site-packages > Paste the cv2.pyd file



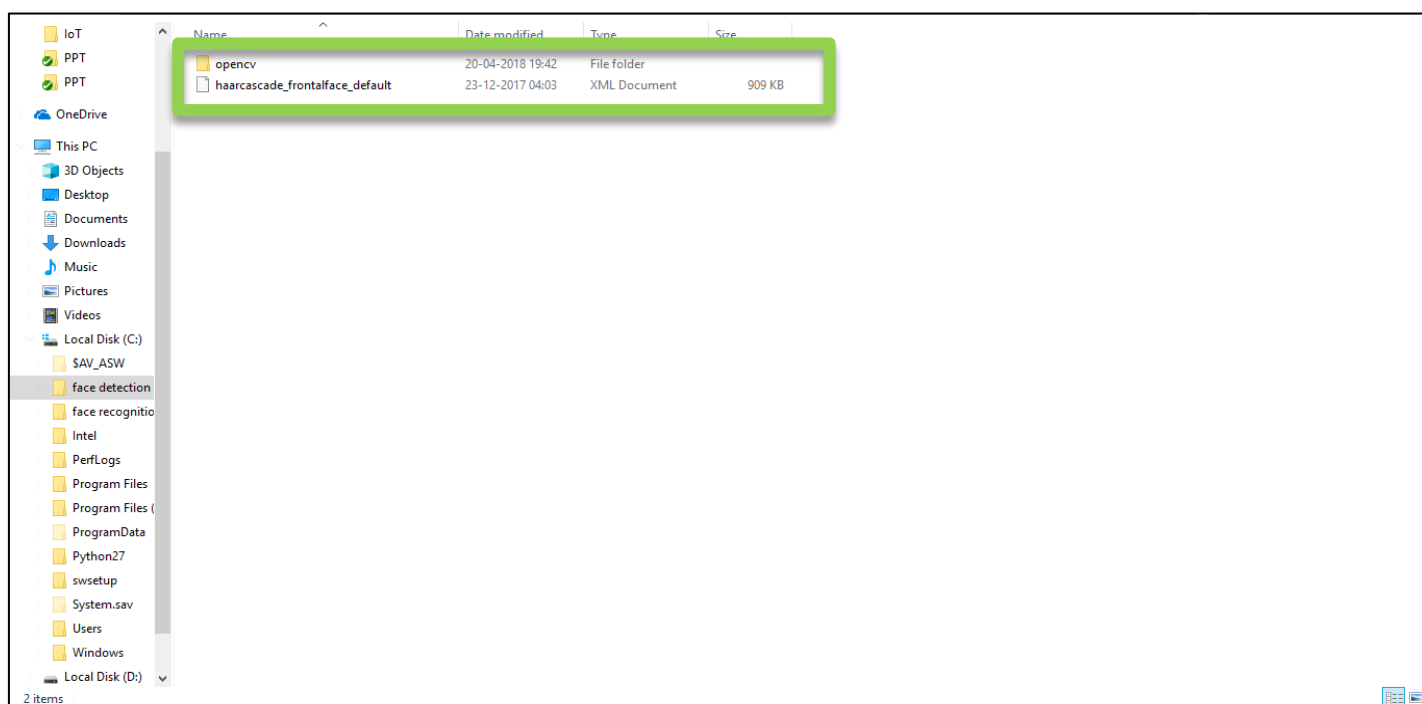
Step 6: Open windows command prompt > Type *cd* and press enter > Type *cd Python27* and press enter > Type *cd Scripts* and press enter > Type *pip install numpy*



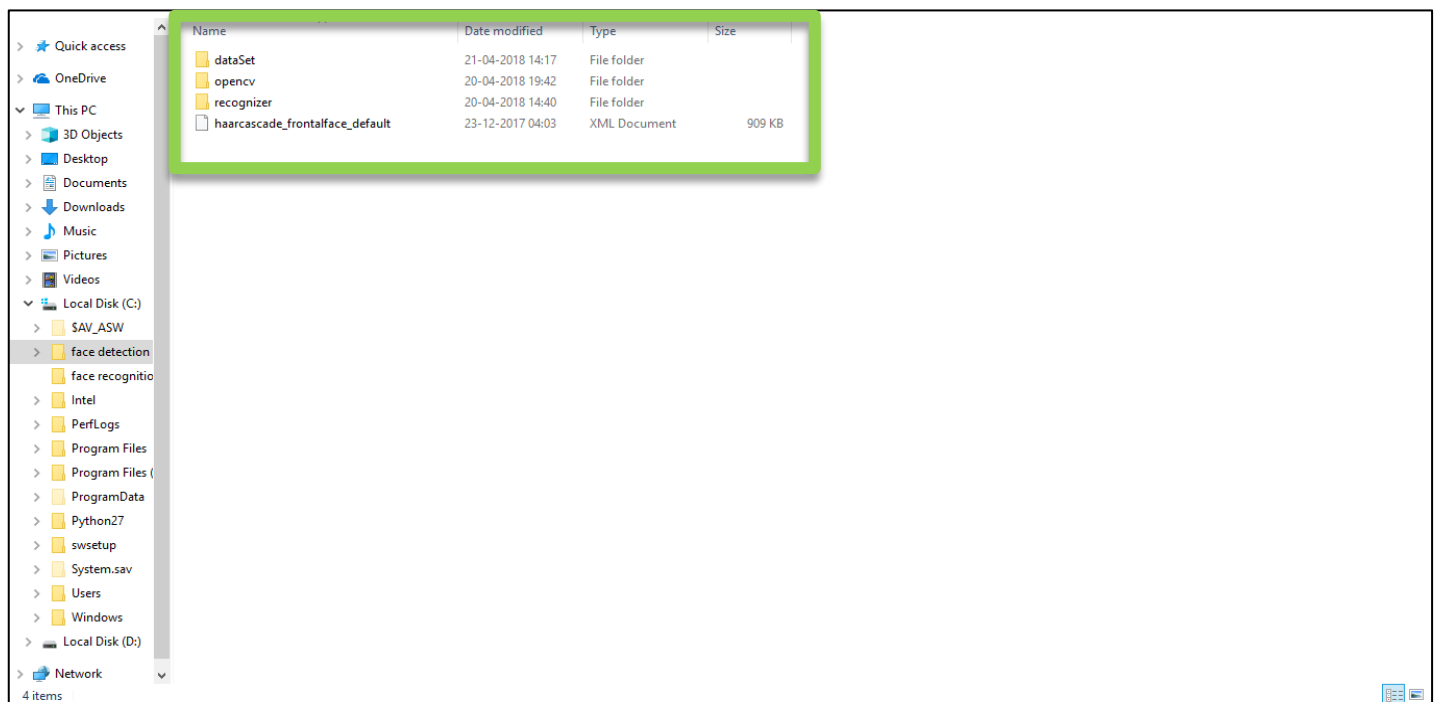
Step 7: Open the folder where OpenCV is downloaded > Go to sources > data > haarcascades > Find the haarcascade_frontalface_default > Copy this file and move it directly inside the OpenCV folder



Step 8: Now your OpenCV folder will look like this



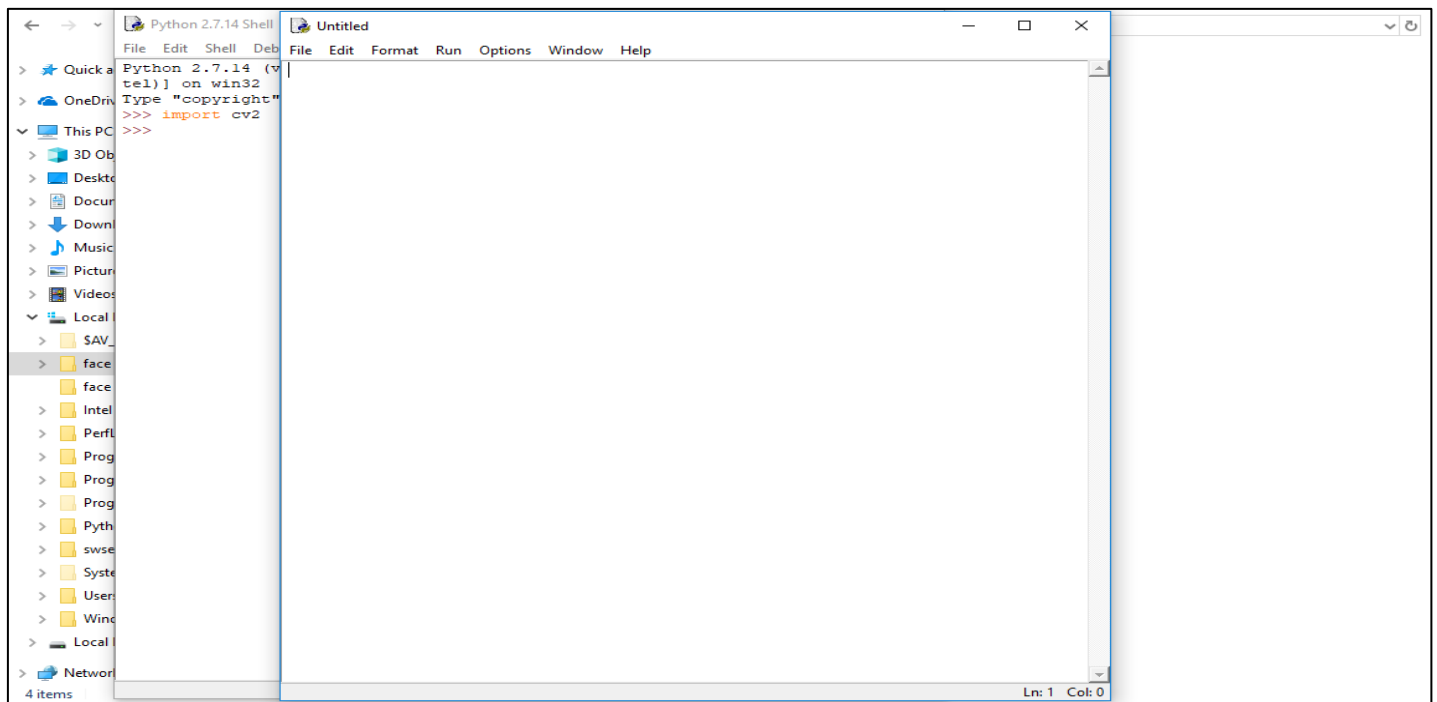
Step 9: Now create two folders inside the OpenCV folder > One with the name *dataSet* and other with the name *recognizer*. Now your OpenCV folder will look like this



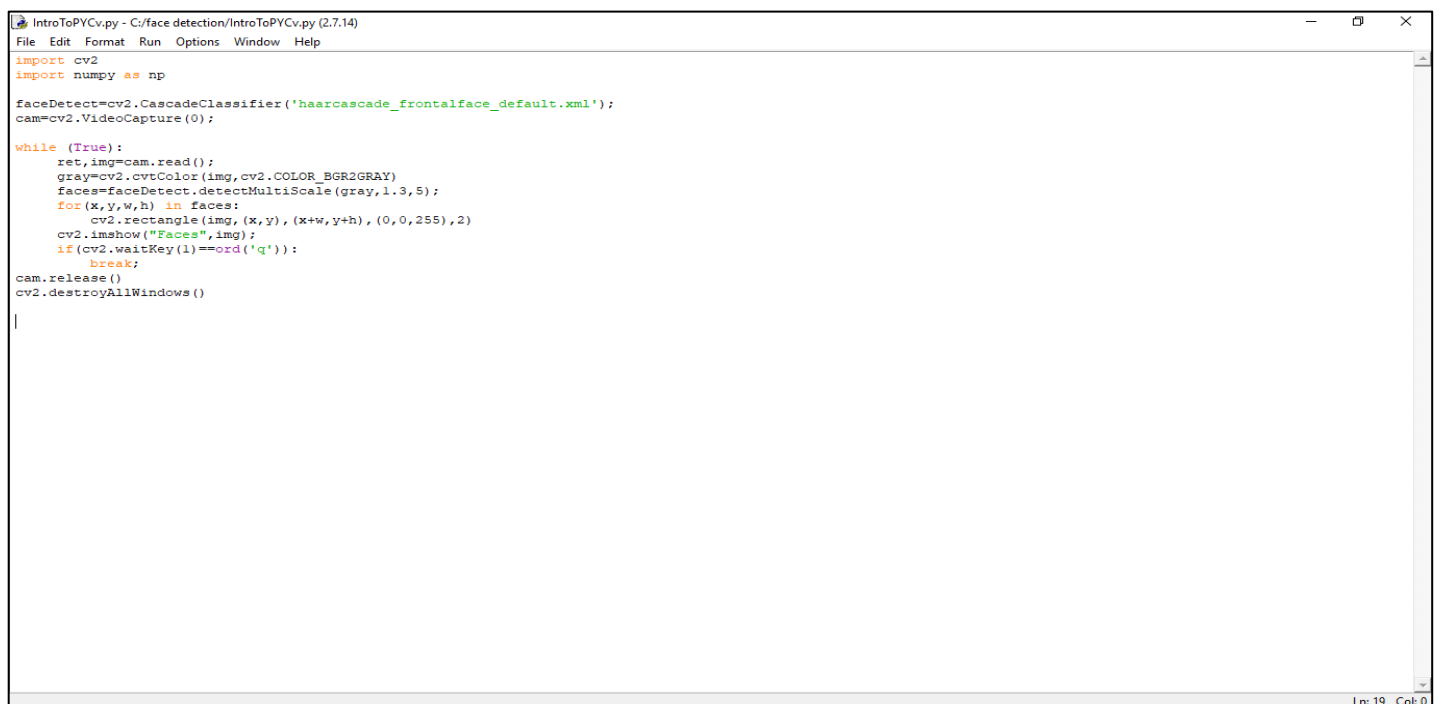
Step 10: Open the Python IDLE > Type `import cv2` and press enter > If no error message pops up then it means that OpenCV is correctly integrated with Python



Step 11: Now Click on File > New File (An untitled window will open)



Step 12: Now we will write a face detection program > You can use the code in **"IntroToPYCv.py"** file available on LMS (Copy the code and Paste in the Untitled Window) > Save the file at the same location where OpenCV is downloaded



Step 13: Run the file and you will be able to see that your face is being detected (This image is sample to show how the programs output will occur) > Press *Ctrl+C* to stop the program

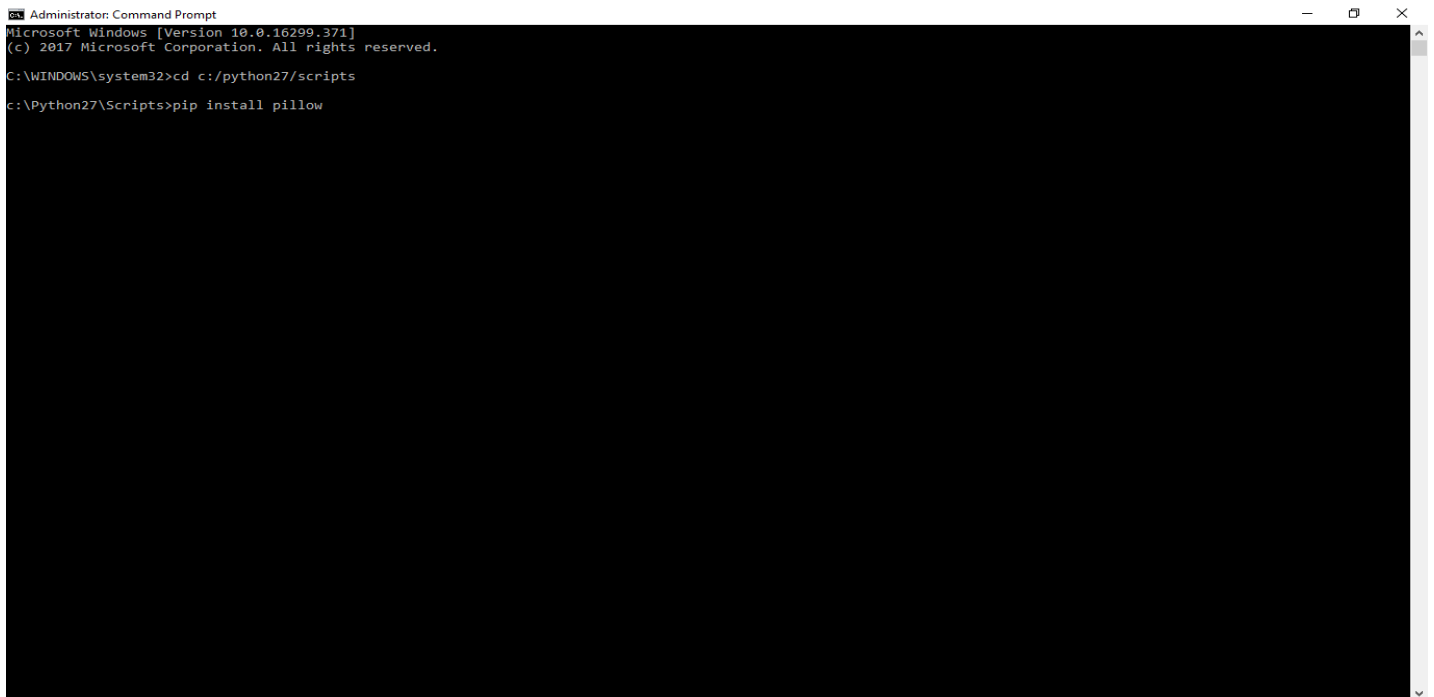


Step 14: Type cmd in you Start Menu Search Bar > Right Click and Select **Run as administrator** > Type `cd c:/python 27/scripts` > Press enter

```
Administrator: Command Prompt
Microsoft Windows [Version 10.0.16299.371]
(c) 2017 Microsoft Corporation. All rights reserved.

C:\WINDOWS\system32>cd c:/python27/scripts
c:\Python27\Scripts>
```


Step 15: Type *pip install pillow* > Press Enter



```
Administrator: Command Prompt
Microsoft Windows [Version 10.0.16299.371]
(c) 2017 Microsoft Corporation. All rights reserved.

C:\WINDOWS\system32>cd c:/python27/scripts
c:\Python27\Scripts>pip install pillow
```

Step 16: Once install is finished > Open Python IDLE > Click File > New File > Now we will write a Data Set Creator program > You can use the code in ***“dataSetCreator.py”*** file available on LMS (Copy the code and Paste in the Untitled Window) > Save the file at the same location where OpenCV is downloaded

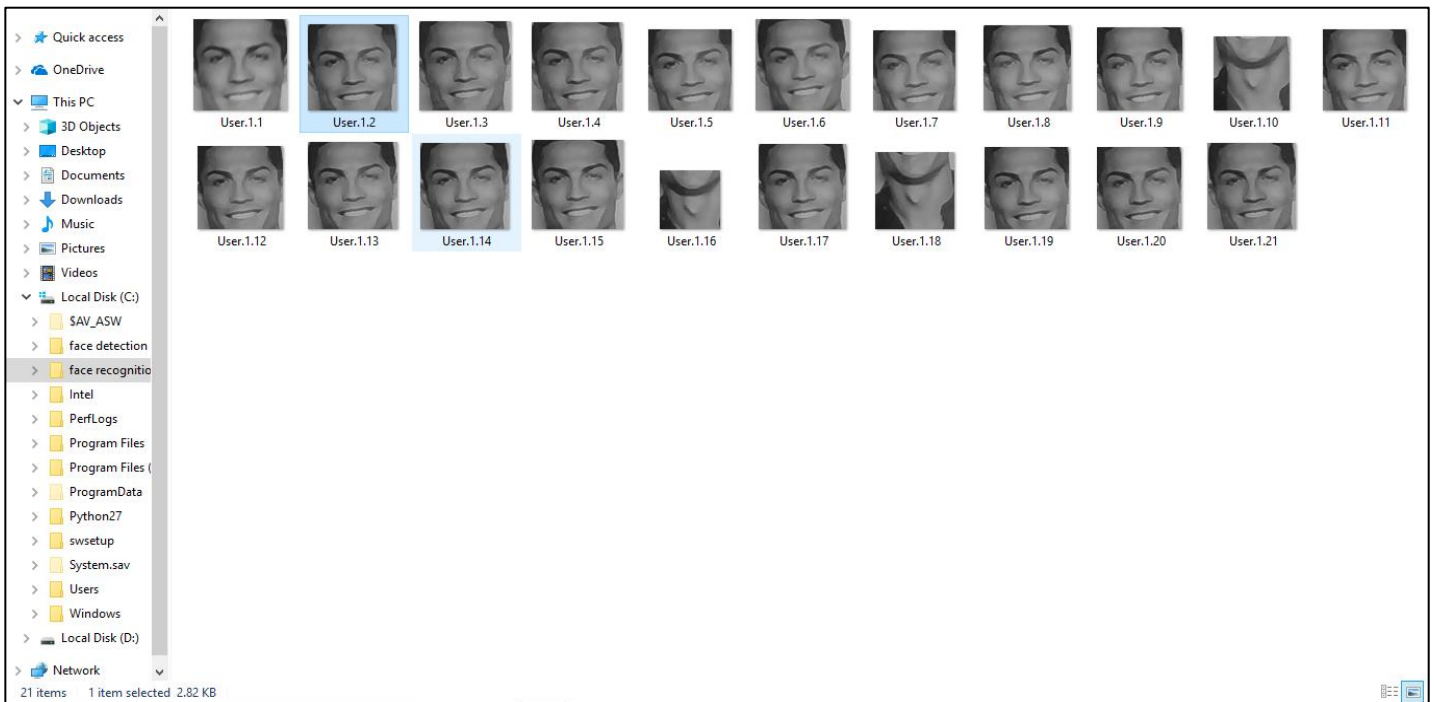


```
dataSetCreator.py - C:\face recognition\dataSetCreator.py (2.7.14)
File Edit Format Run Options Window Help
import cv2
import numpy as np

faceDetect=cv2.CascadeClassifier('haarcascade_frontalface_default.xml');
cam=cv2.VideoCapture(0);

id=raw_input("Enter user id")
sampleNumber=0;
while (True):
    ret,img=cam.read();
    gray=cv2.cvtColor(img,cv2.COLOR_BGR2GRAY)
    faces=faceDetect.detectMultiScale(gray,1.3,5);
    for(x,y,w,h) in faces:
        sampleNumber=sampleNumber+1;
        cv2.imwrite("dataSet/User."+str(id)+"."+str(sampleNumber)+".jpg",gray[y:y+h,x:x+w])
        cv2.rectangle(img,(x,y),(x+w,y+h),(0,0,255),2)
        cv2.waitKey(100);
    cv2.imshow("Faces",img);
    cv2.waitKey(1);
    if(sampleNumber>20):
        break
cam.release()
cv2.destroyAllWindows()
```

Step 17: Run the file > The program will exit on its own after few seconds > Go to the dataSet folder that you created > Open the folder > You will see the gray scale images of the input image



Step 18: Open Python IDLE > Click File > New File > Now we will write a Data Trainer program > You can use the code in **“trainer.py”** file available on LMS (Copy the code and Paste in the Untitled Window) > Save the file at the same location where OpenCV is downloaded

```

trainer.py - C:\face recognition\trainer.py (2.7.14)
File Edit Format Run Options Window Help

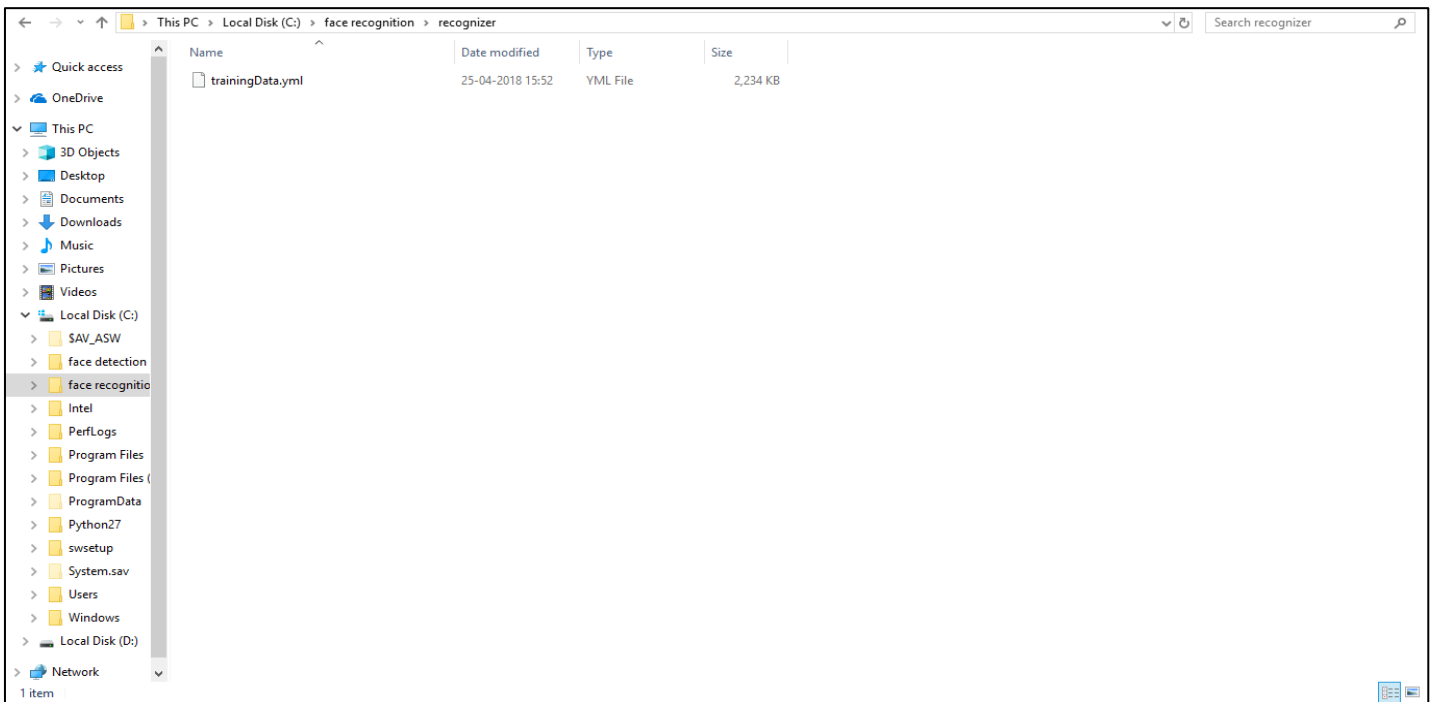
import os
import cv2
import numpy as np
from PIL import Image

recognizer=cv2.createLBPHFaceRecognizer();
path='dataSet'

def getImagesWithID(path):
    imagePaths=[os.path.join(path,f) for f in os.listdir(path)]
    faces=[]
    IDs=[]
    for imagePath in imagePaths:
        faceImg=Image.open(imagePath).convert('L');
        faceNp=np.array(faceImg,'uint8')
        ID=int(os.path.split(imagePath)[-1].split('.')[1])
        faces.append(faceNp)
        IDs.append(ID)
        cv2.imshow("training",faceNp)
        cv2.waitKey(10)
    return np.array(IDs), faces

Ids,faces=getImagesWithID(path)
recognizer.train(faces,Ids)
recognizer.save('recognizer/trainingData.yml')
cv2.destroyAllWindows()
    
```

Step 19: Run the file > The program will exit on its own after few seconds > Go to the recognizer folder that you created > Open the folder > You will see that an *trainingData.yml* is created



Step 20: Open Python IDLE > Click File > New File > Now we will write a Face Recognizer program > You can use the code in “*detector.py*” file available on LMS (Copy the code and Paste in the Untitled Window) > Save the file at the same location where OpenCV is downloaded



Step 21: Run the file and you will be able to see that your face is being recognized (This image is sample to show how the programs output will occur) > Press *Ctrl+C* to stop the program

