PCV Practical - 3

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PRELAB:-

1.What is the difference between image and videos?

A. Video could be described as a series of photos (normally set at 24 frames (or photos) per second). In video, especially digital video, there is the added difference, that most video is compressed in some form or other, to save data storage. Much like a jpeg photo is compressed and does not contain individual data for each and every pixel, video is compressed in a way so not all frames contain all data to comprise a full picture. Simply, there are I-frames (or key/reference-frames), that contain the data needed to form a picture, and in between are a number of p-frames (or "predicted" frames), which basically contains only the differences from one frame to the next.

2. When do we use cv2.waitKey(0) and cv2.waitKey(1)?

A. waitKey(0) will display the window infinitely until any keypress (it is suitable for image display). waitKey(1) will display a frame for 1 ms, after which display will be automatically closed. Since the OS has a minimum time between switching threads, the function will not wait exactly 1 ms, it will wait at least 1 ms, depending on what else is running on your computer at that time. So, if you use waitKey(0) you see a still image until you actually press something while for waitKey(1) the function will show a frame for at least 1 ms only.

3. Define the terms Frame Rate and Resolution?

A. To the human eye, film and video seem to play as one continuous recording. But in actuality, cameras record pictures of multiple images, called frames. These frames are played back at such a fast rate that they appear to be in fluid motion. Frame rate is the measurement of how quickly a number of frames appears within a second, which is why it’s also called FPS (frames per second). Resolution is the detail an image holds. The term applies to digital images, film images, and other types of images. Higher resolution means more image detail. Resolution can be measured in various ways. Resolution quantifies how close lines can be to each other and still be visibly resolved.

4. What is a codec and gives a few examples of codec?

A. Codec is short for "coder-decoder." It is an algorithm used to encode data, such as an audio or video clip. The encoded data must be decoded when played back. Examples of lossy audio codecs are Adaptive Differential Pulse Code Modulation (ADPCM) and MPEG-1 Layer 3 (MP3). Common lossy video codecs include MPEG-2 and HEVC. Most lossy codecs provide a variable compression setting, which allows you to select how much to compress the media

INLAB:-

1. Jessy once visited the cctv room of her college. Then she saw the Live Video Feed Capture of her entire college and she also became interested in Live Video Feed from Camera. so help her in implementing the following requirements

1. Start a Live Video Feed Capture from Camera or Webcam

2. Create two Windows Both should display The Live Video Feed from camera

3.Window 1.It should be color Video

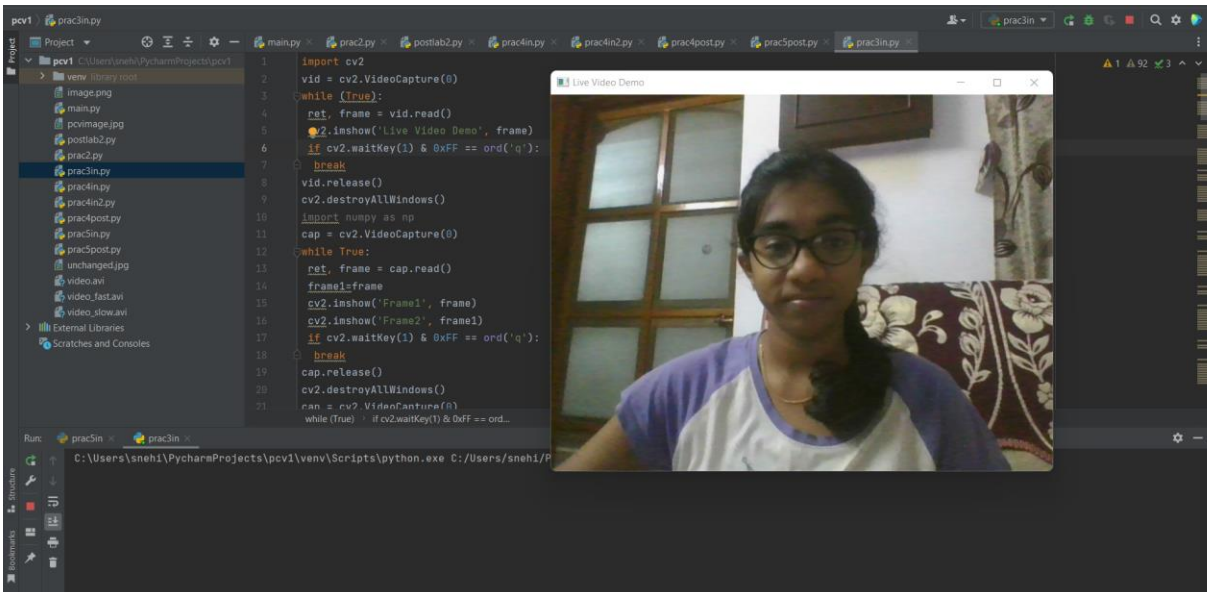
4.Window 2.It should be gray Scale and upside down i.e inverted

5. Also Both of these windows should display the Date and Current time

6. Here the Live Feed should stop as soon as you enter a character 'q'

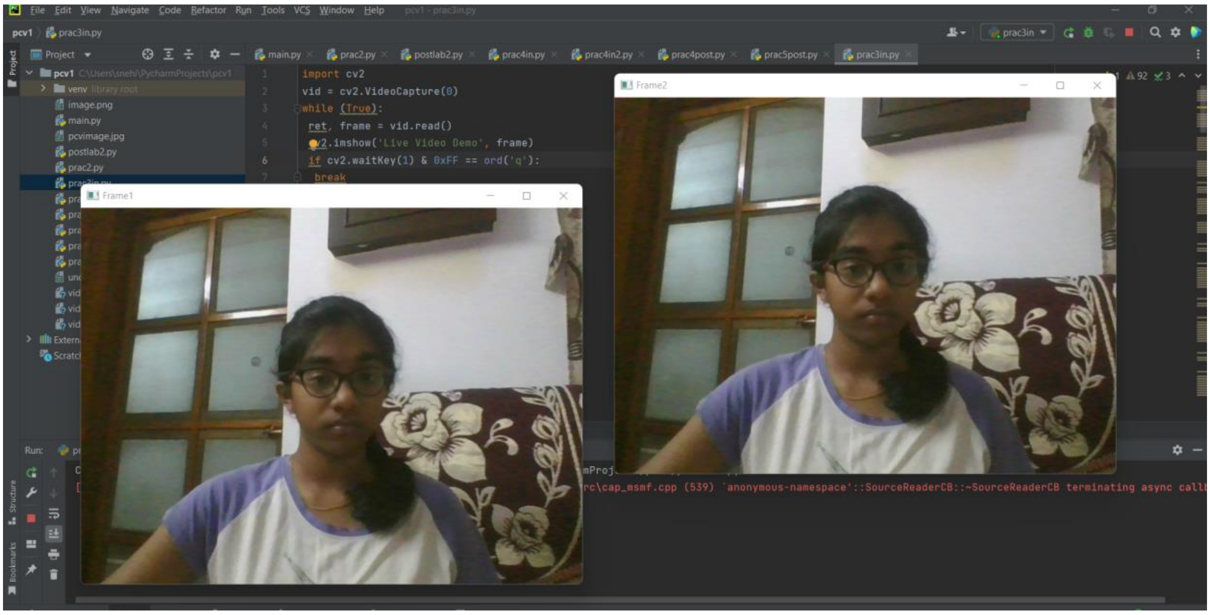
7. Also save the Window 1 video as two ".avi" file.one file should be slow speed of video playback -and other one should be high speed of video playback

Screenshots:



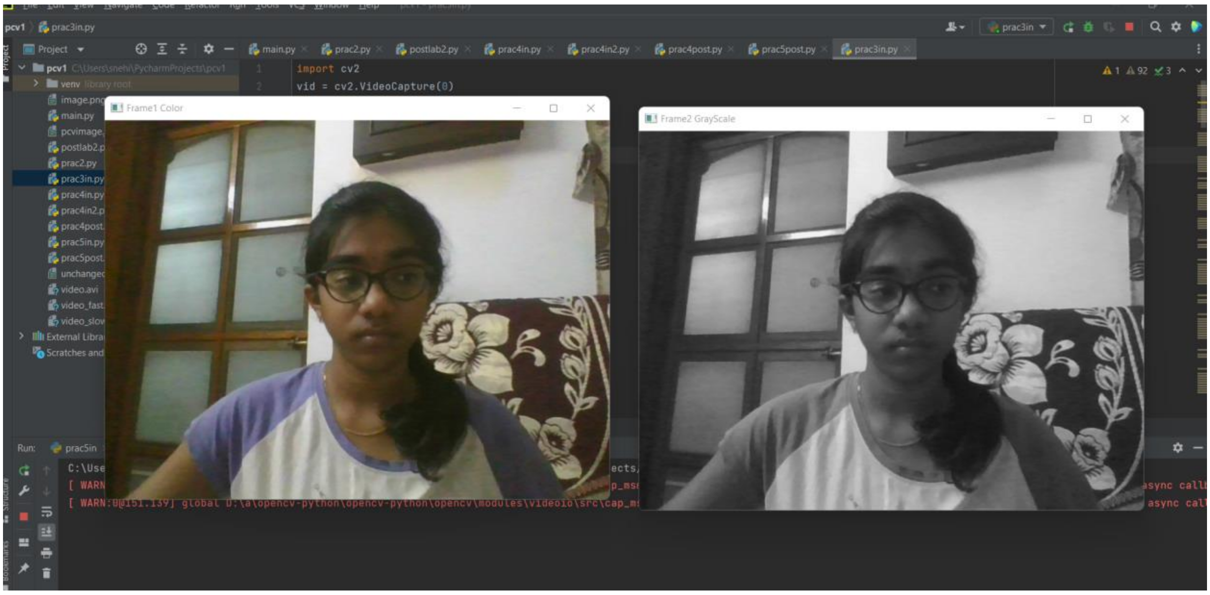
```
import cv2
vid = cv2.VideoCapture(0)
while (True):
 ret, frame = vid.read()
 cv2.imshow('Live Video Demo', frame)
 if cv2.waitKey(1) & 0xFF == ord('q'):
  break
vid.release()
cv2.destroyAllWindows()
import numpy as np
cap = cv2.VideoCapture(0)
while True:
 ret, frame = cap.read()
 frame1=frame
 cv2.imshow('Frame1', frame)
 cv2.imshow('Frame2', frame1)
 if cv2.waitKey(1) & 0xFF == ord('q'):
  break
cap.release()
cv2.destroyAllWindows()
cap = cv2.VideoCapture(0)
```

```
C:\Users\snehi\PycharmProjects\pcv1\venv\Scripts\python.exe C:/Users/snehi/P
```


File Edit View Navigate Code Refactor Run Tools VCS Window Help pcv1 - prac3in.py
pcv1 〉 prac3in.py
Frame1
Frame2
Run:

```
import cv2
vid = cv2.VideoCapture(0)
while (True):
 ret, frame = vid.read()
 cv2.imshow('Live Video Demo', frame)
 if cv2.waitKey(1) & 0xFF == ord('q'):
  break
```

```
mProj
rc\cap_msmf.cpp (539) `anonymous-namespace'::SourceReaderCB::~SourceReaderCB terminating async callb
```



```
import cv2
vid = cv2.VideoCapture(0)
```

```
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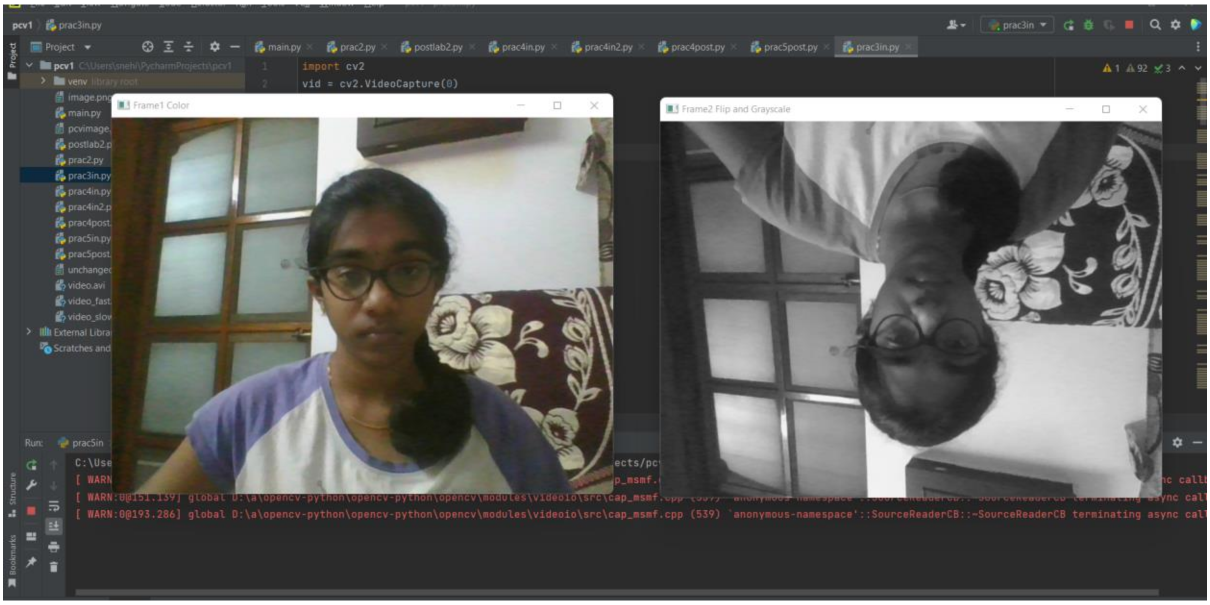
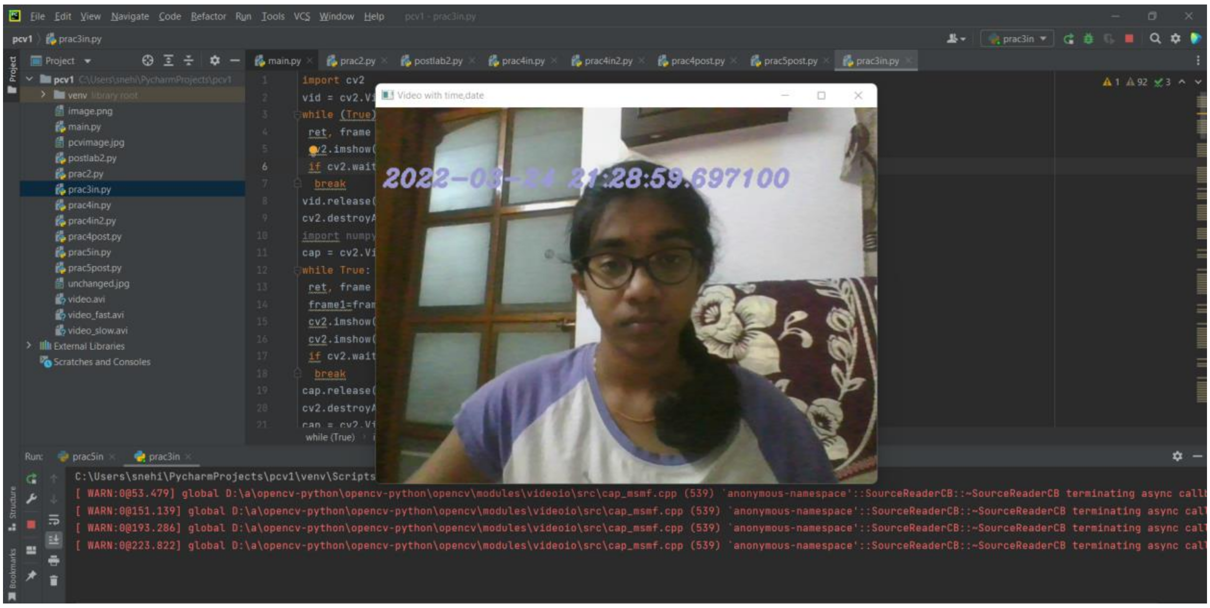
[ WARN                                                  p_ms                                                  async callb
[ WARN:0@151.139] global D:\a\opencv-python\opencv-python\opencv\modules\videoio\src\cap_m   async call
```



```
import cv2
vid = cv2.VideoCapture(0)
```

```
C:\Use                                                                                    ects/pc
[ WARN                                                                                    p_msmf.                                                                                          nc call
[ WARN:0@151.139] global D:\a\opencv-python\opencv-python\opencv\modules\videoio\src\cap_msmf.cpp (539) `anonymous-namespace'::SourceReaderCB::~SourceReaderCB terminating async cal
[ WARN:0@193.286] global D:\a\opencv-python\opencv-python\opencv\modules\videoio\src\cap_msmf.cpp (539) `anonymous-namespace'::SourceReaderCB::~SourceReaderCB terminating async cal
```



```
import cv2
vid = cv2.Vi
while (True)
 ret, frame
 cv2.imshow(
 if cv2.wait
  break
vid.release(
cv2.destroyA
import numpy
cap = cv2.Vi
while True:
 ret, frame
 frame1=fram
 cv2.imshow(
 cv2.imshow(
 if cv2.wait
  break
cap.release(
cv2.destroyA
cap = cv2.Vi
```

```
C:\Users\snehi\PycharmProjects\pcv1\venv\Scripts
[ WARN:0@53.479] global D:\a\opencv-python\opencv-python\opencv\modules\videoio\src\cap_msmf.cpp (539) `anonymous-namespace'::SourceReaderCB::~SourceReaderCB terminating async call
[ WARN:0@151.139] global D:\a\opencv-python\opencv-python\opencv\modules\videoio\src\cap_msmf.cpp (539) `anonymous-namespace'::SourceReaderCB::~SourceReaderCB terminating async cal
[ WARN:0@193.286] global D:\a\opencv-python\opencv-python\opencv\modules\videoio\src\cap_msmf.cpp (539) `anonymous-namespace'::SourceReaderCB::~SourceReaderCB terminating async cal
[ WARN:0@223.822] global D:\a\opencv-python\opencv-python\opencv\modules\videoio\src\cap_msmf.cpp (539) `anonymous-namespace'::SourceReaderCB::~SourceReaderCB terminating async cal
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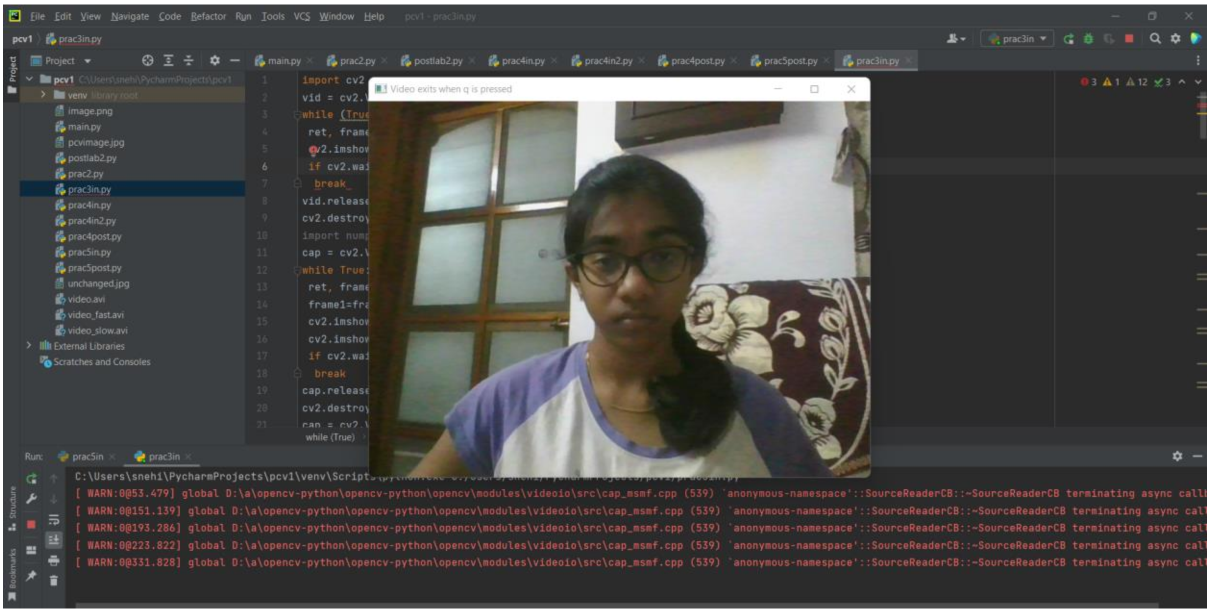
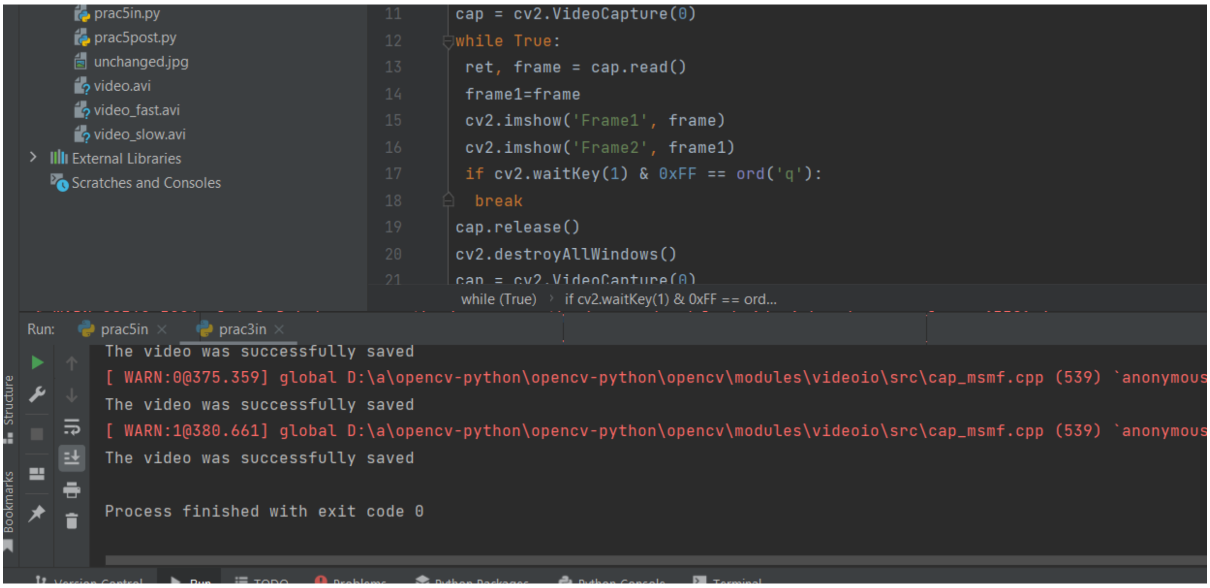


```
import cv2
vid = cv2.\
while (True
 ret, frame
 cv2.imshow
 if cv2.wai
  break
vid.release
cv2.destroy
import num
cap = cv2.\
while True:
 ret, frame
 frame1=fra
 cv2.imshow
 cv2.imshow
 if cv2.wai
  break
cap.release
cv2.destroy
cap = cv2.\
```

```
C:\Users\snehi\PycharmProjects\pcv1\venv\Scripts
[ WARN:0@53.479] global D:\a\opencv-python\opencv-python\opencv\modules\videoio\src\cap_msmf.cpp (539) `anonymous-namespace'::SourceReaderCB::~SourceReaderCB terminating async call
[ WARN:0@151.139] global D:\a\opencv-python\opencv-python\opencv\modules\videoio\src\cap_msmf.cpp (539) `anonymous-namespace'::SourceReaderCB::~SourceReaderCB terminating async cal
[ WARN:0@193.286] global D:\a\opencv-python\opencv-python\opencv\modules\videoio\src\cap_msmf.cpp (539) `anonymous-namespace'::SourceReaderCB::~SourceReaderCB terminating async cal
[ WARN:0@223.822] global D:\a\opencv-python\opencv-python\opencv\modules\videoio\src\cap_msmf.cpp (539) `anonymous-namespace'::SourceReaderCB::~SourceReaderCB terminating async cal
[ WARN:0@331.828] global D:\a\opencv-python\opencv-python\opencv\modules\videoio\src\cap_msmf.cpp (539) `anonymous-namespace'::SourceReaderCB::~SourceReaderCB terminating async cal
```



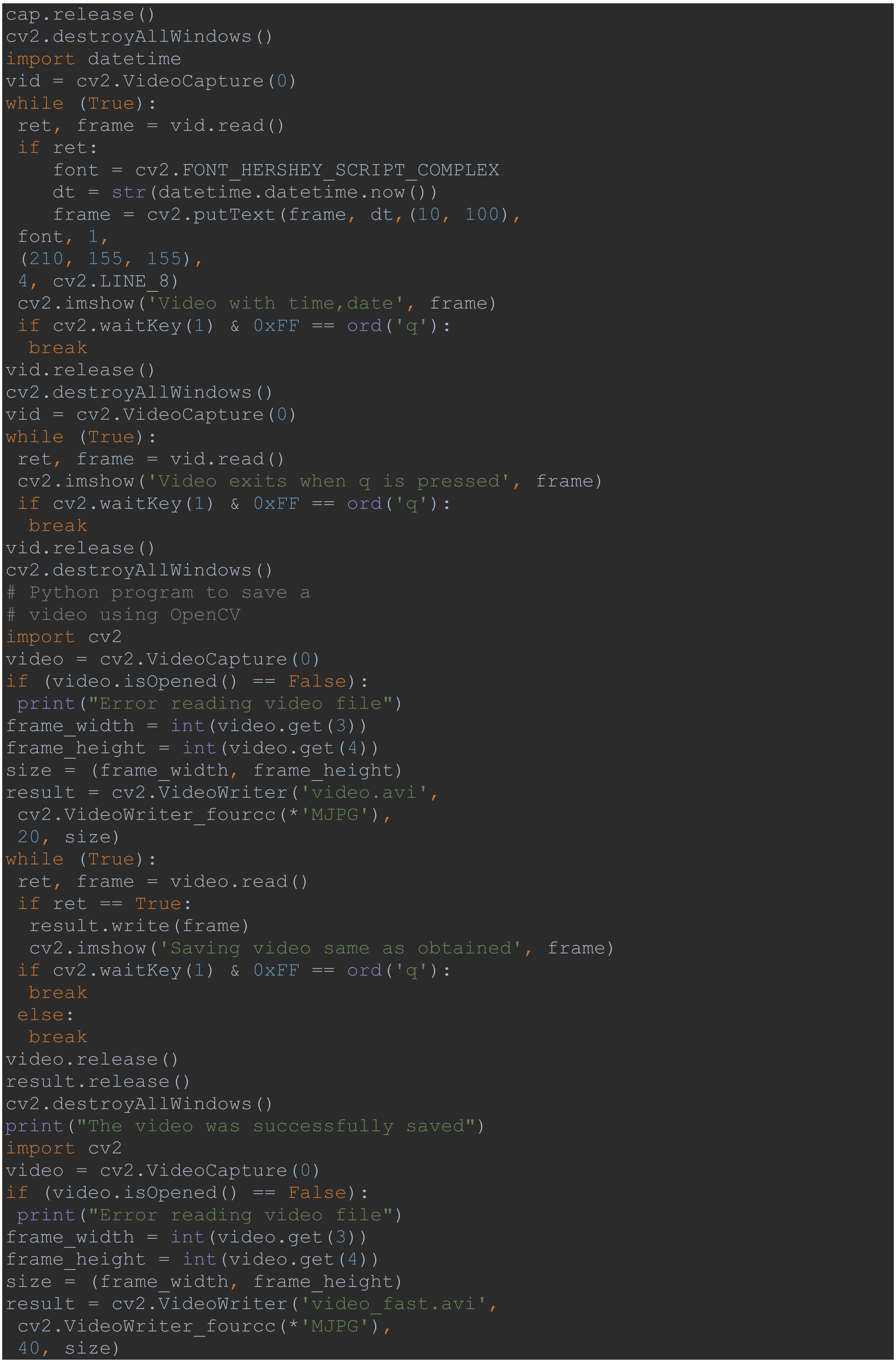
```
cap = cv2.VideoCapture(0)
while True:
 ret, frame = cap.read()
 frame1=frame
 cv2.imshow('Frame1', frame)
 cv2.imshow('Frame2', frame1)
 if cv2.waitKey(1) & 0xFF == ord('q'):
  break
cap.release()
cv2.destroyAllWindows()
cap = cv2.VideoCapture(0)
```

```
The video was successfully saved
[ WARN:0@375.359] global D:\a\opencv-python\opencv-python\opencv\modules\videoio\src\cap_msmf.cpp (539) `anonymous
The video was successfully saved
[ WARN:1@380.661] global D:\a\opencv-python\opencv-python\opencv\modules\videoio\src\cap_msmf.cpp (539) `anonymous
The video was successfully saved

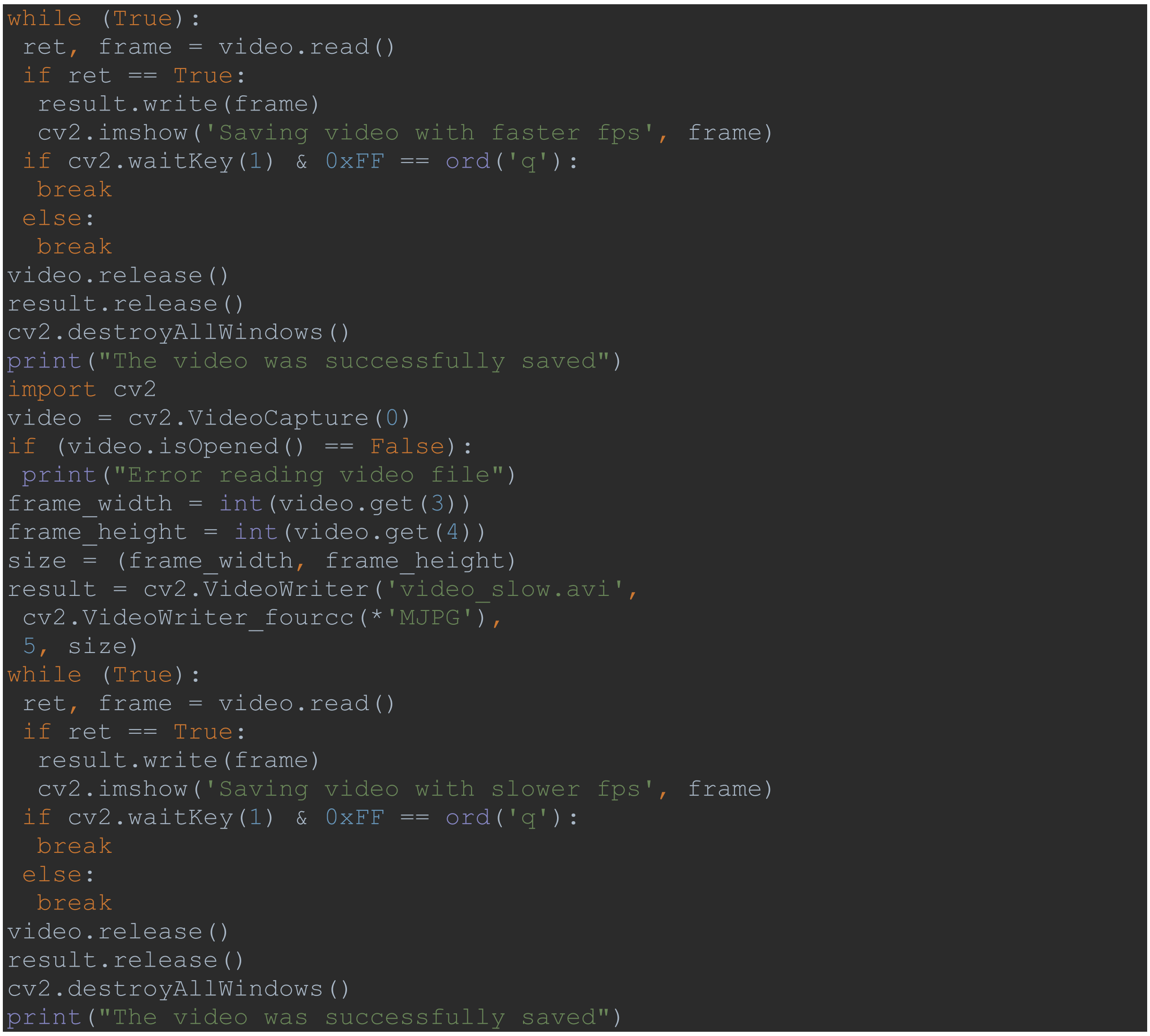
Process finished with exit code 0
```

Code:-

```
import cv2
vid = cv2.VideoCapture(0)
while (True):
 ret, frame = vid.read()
 cv2.imshow('Live Video Demo', frame)
 if cv2.waitKey(1) & 0xFF == ord('q'):q
  break
vid.release()
cv2.destroyAllWindows()
import numpy as np
cap = cv2.VideoCapture(0)
while True:
 ret, frame = cap.read()
 frame1=frame
 cv2.imshow('Frame1', frame)
 cv2.imshow('Frame2', frame1)
 if cv2.waitKey(1) & 0xFF == ord('q'):
  break
cap.release()
cv2.destroyAllWindows()
cap = cv2.VideoCapture(0)
while True:
 ret, frame = cap.read()
 frame1=cv2.cvtColor(frame, cv2.COLOR_BGR2GRAY)
 cv2.imshow('Frame1 Color', frame)
 cv2.imshow('Frame2 GrayScale', frame1)
 if cv2.waitKey(1) & 0xFF == ord('q'):
  break
cap.release()
cv2.destroyAllWindows()
cap = cv2.VideoCapture(0)
while True:
 ret, frame = cap.read()
 frame1=cv2.cvtColor(frame, cv2.COLOR_BGR2GRAY)
 frame1 = cv2.flip(frame1, 0)
 cv2.imshow('Frame1 Color', frame)
 cv2.imshow('Frame2 Flip and Grayscale', frame1)
 if cv2.waitKey(1) & 0xFF == ord('q'):
  break
```



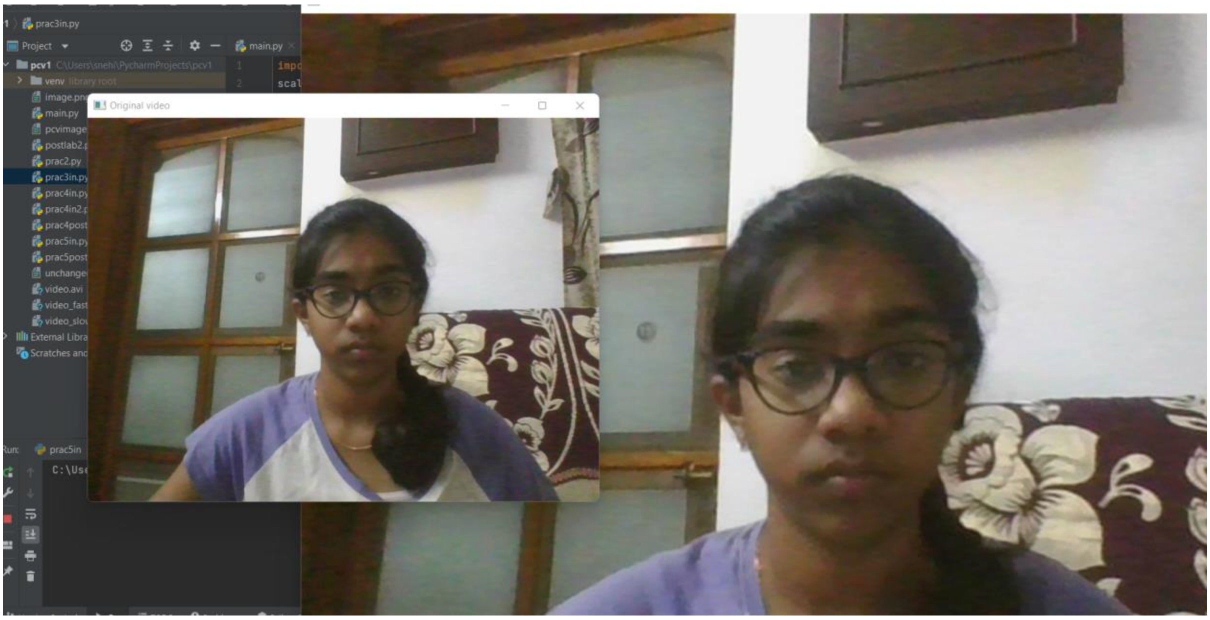
```
cap.release()
cv2.destroyAllWindows()
import datetime
vid = cv2.VideoCapture(0)
while (True):
 ret, frame = vid.read()
 if ret:
    font = cv2.FONT_HERSHEY_SCRIPT_COMPLEX
    dt = str(datetime.datetime.now())
    frame = cv2.putText(frame, dt,(10, 100),
 font, 1,
 (210, 155, 155),
 4, cv2.LINE_8)
 cv2.imshow('Video with time,date', frame)
 if cv2.waitKey(1) & 0xFF == ord('q'):
  break
vid.release()
cv2.destroyAllWindows()
vid = cv2.VideoCapture(0)
while (True):
 ret, frame = vid.read()
 cv2.imshow('Video exits when q is pressed', frame)
 if cv2.waitKey(1) & 0xFF == ord('q'):
  break
vid.release()
cv2.destroyAllWindows()
# Python program to save a
# video using OpenCV
import cv2
video = cv2.VideoCapture(0)
if (video.isOpened() == False):
 print("Error reading video file")
frame_width = int(video.get(3))
frame_height = int(video.get(4))
size = (frame_width, frame_height)
result = cv2.VideoWriter('video.avi',
 cv2.VideoWriter_fourcc(*'MJPG'),
 20, size)
while (True):
 ret, frame = video.read()
 if ret == True:
  result.write(frame)
  cv2.imshow('Saving video same as obtained', frame)
 if cv2.waitKey(1) & 0xFF == ord('q'):
  break
 else:
  break
video.release()
result.release()
cv2.destroyAllWindows()
print("The video was successfully saved")
import cv2
video = cv2.VideoCapture(0)
if (video.isOpened() == False):
 print("Error reading video file")
frame_width = int(video.get(3))
frame_height = int(video.get(4))
size = (frame_width, frame_height)
result = cv2.VideoWriter('video_fast.avi',
 cv2.VideoWriter_fourcc(*'MJPG'),
 40, size)
```



```
while (True):
 ret, frame = video.read()
 if ret == True:
  result.write(frame)
  cv2.imshow('Saving video with faster fps', frame)
 if cv2.waitKey(1) & 0xFF == ord('q'):
  break
 else:
  break
video.release()
result.release()
cv2.destroyAllWindows()
print("The video was successfully saved")
import cv2
video = cv2.VideoCapture(0)
if (video.isOpened() == False):
 print("Error reading video file")
frame_width = int(video.get(3))
frame_height = int(video.get(4))
size = (frame_width, frame_height)
result = cv2.VideoWriter('video_slow.avi',
 cv2.VideoWriter_fourcc(*'MJPG'),
 5, size)
while (True):
 ret, frame = video.read()
 if ret == True:
  result.write(frame)
  cv2.imshow('Saving video with slower fps', frame)
 if cv2.waitKey(1) & 0xFF == ord('q'):
  break
 else:
  break
video.release()
result.release()
cv2.destroyAllWindows()
print("The video was successfully saved")
```

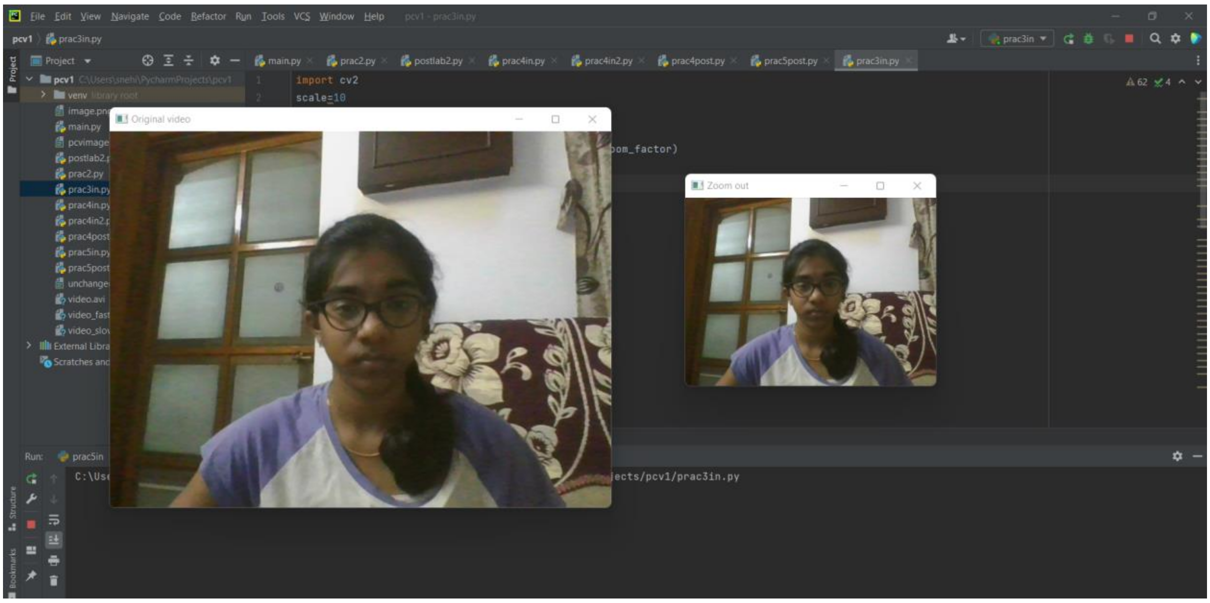
Postlab

1. Now Jessy wants to implement Live Video Feed Capture and create window which will zoom in and zoom out the live video and also rotate(360 degrees) the window continuously.



```
impo
scal
```

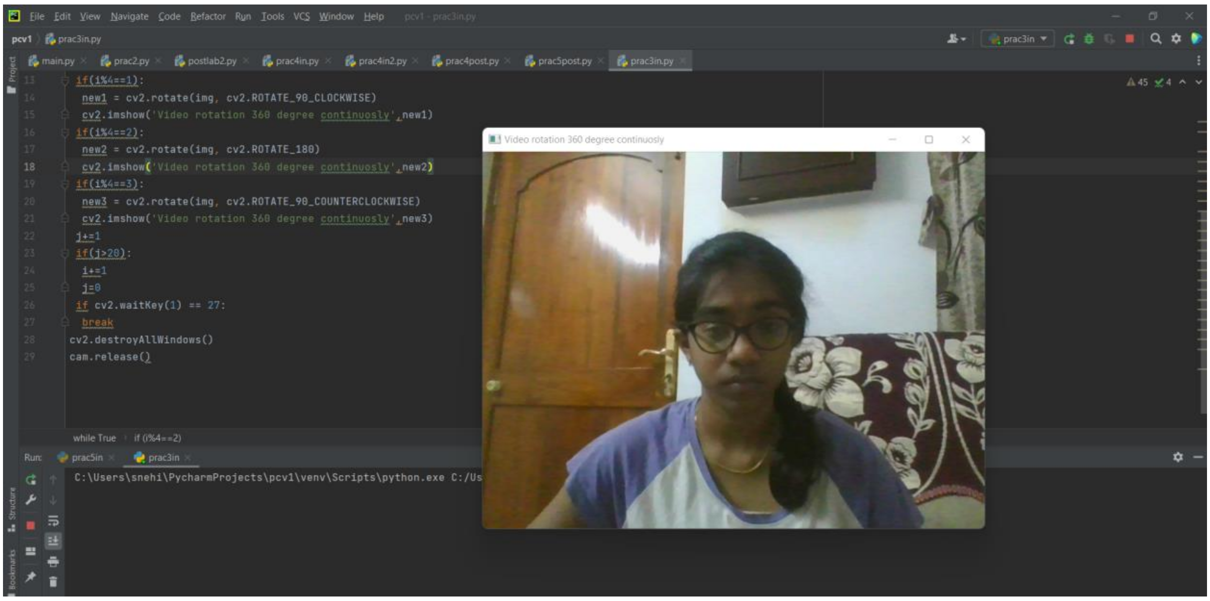
```
C:\Use
```



```
import cv2
scale=10
```

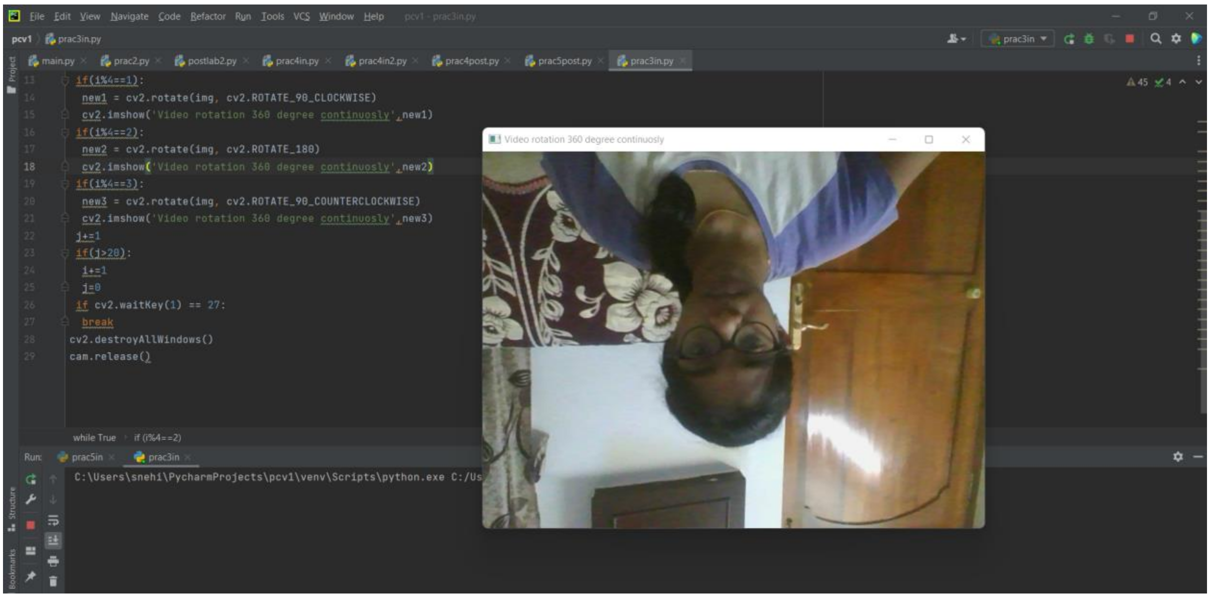
```
om_factor)
```

```
C:\Use
ects/pcv1/prac3in.py
```



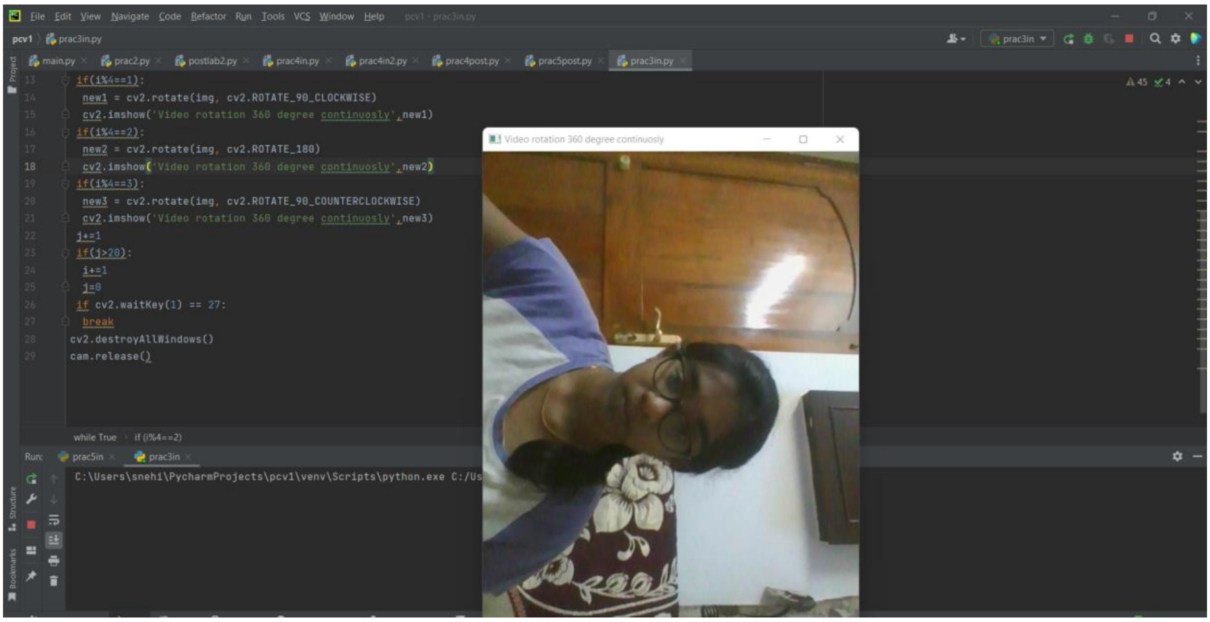
```
 if(i%4==1):
  new1 = cv2.rotate(img, cv2.ROTATE_90_CLOCKWISE)
  cv2.imshow('Video rotation 360 degree continuosly',new1)
 if(i%4==2):
  new2 = cv2.rotate(img, cv2.ROTATE_180)
  cv2.imshow('Video rotation 360 degree continuosly',new2)
 if(i%4==3):
  new3 = cv2.rotate(img, cv2.ROTATE_90_COUNTERCLOCKWISE)
  cv2.imshow('Video rotation 360 degree continuosly',new3)
 j+=1
 if(j>20):
  i+=1
  j=0
 if cv2.waitKey(1) == 27:
  break
cv2.destroyAllWindows()
cam.release()
```

```
C:\Users\snehi\PycharmProjects\pcv1\venv\Scripts\python.exe C:/Us
```



```
 if(i%4==1):
  new1 = cv2.rotate(img, cv2.ROTATE_90_CLOCKWISE)
  cv2.imshow('Video rotation 360 degree continuosly',new1)
 if(i%4==2):
  new2 = cv2.rotate(img, cv2.ROTATE_180)
  cv2.imshow('Video rotation 360 degree continuosly',new2)
 if(i%4==3):
  new3 = cv2.rotate(img, cv2.ROTATE_90_COUNTERCLOCKWISE)
  cv2.imshow('Video rotation 360 degree continuosly',new3)
 j+=1
 if(j>20):
  i+=1
  j=0
 if cv2.waitKey(1) == 27:
  break
cv2.destroyAllWindows()
cam.release()
```

```
C:\Users\snehi\PycharmProjects\pcv1\venv\Scripts\python.exe C:/Us
```



```
 if(i%4==1):
  new1 = cv2.rotate(img, cv2.ROTATE_90_CLOCKWISE)
  cv2.imshow('Video rotation 360 degree continuosly',new1)
 if(i%4==2):
  new2 = cv2.rotate(img, cv2.ROTATE_180)
  cv2.imshow('Video rotation 360 degree continuosly',new2)
 if(i%4==3):
  new3 = cv2.rotate(img, cv2.ROTATE_90_COUNTERCLOCKWISE)
  cv2.imshow('Video rotation 360 degree continuosly',new3)
 j+=1
 if(j>20):
  i+=1
  j=0
 if cv2.waitKey(1) == 27:
  break
cv2.destroyAllWindows()
cam.release()
```

```
C:\Users\snehi\PycharmProjects\pcv1\venv\Scripts\python.exe C:/Us
```