

FAQS FOR LESSON-5

IMPORTANT NOTE:-

Don't Forget to Click That Source Env Button (Blue Button)

Most of the time, Error occurs because you have not pressed it !!

[If you have pressed it & still getting the error then move further to see other reasons for your error]

1. What to do when finished the course? What is next?

Ans:- If you are done with the lessons, make sure to check all the lessons for any unanswered quiz, I did and I found one unanswered quiz 😊 .

And also try to keep being active on slack till the end of program by:

- helping others,
- sharing a cool project you have done or you are doing or you just have in mind. You may be able to make a team to work on it here on #projects channel.
- sharing interesting and useful resources on #resources channel
-

That would probably increase the chance of getting into the 2nd phase.

2. The Mosca server isn't starting when i am doing node ./server.js . throwing an error ? [Exercise - Server Communication]

Ans :- First, get the MQTT broker and UI installed :-

- cd webservice/server
- npm install
- When complete, cd ../ui
- And again, npm install

You will need four separate terminal windows open in order to see the results. The steps below should be done in a different terminal based on

number. You can open a new terminal in the workspace in the upper left (File>>New>>Terminal).

(Each number below corresponds to a new terminal window)

Get the MQTT broker installed and running.

- `cd webservice/server/node-server`
- `node ./server.js`
- You should see a message that Mosca server started..

Get the UI Node Server running.

- `cd webservice/ui`
- `npm run dev`
- After a few seconds, you should see webpack: Compiled successfully.

Start the ffmpeg server

- `sudo ffmpeg -f ./ffmpeg/server.conf`

Start the actual application.

- First, you need to source the environment for OpenVINO in the new terminal:
- `source /opt/intel/opencvino/bin/setupvars.sh -pyver 3.5`
- To run the app, I'll give you two items to pipe in with ffmpeg here, with the rest up to you:
- `-video_size 1280x720`
- `-i - http://0.0.0.0:3004/fac.ffmpeg`

Also be sure to click on the Source Env at the beginning

3. what does this block of code mean? and where do we need to place it?

```
"topic = "some_string"
```

```
client.publish(topic, json.dumps({"stat_name": statistic}))"
```

Ans:- this is the MQTT client and is publishing the json to the specified <topic>. For the exercise you need to use something like this:

```
client.publish("speedometer", json.dumps({"speed": speed}))
```

You can place this code after the inference is made. They use MQTT as a broker between the web app and the python script.

4. On Lesson 5.14, I'm getting the following error:

```
(venv) root@6cfa502846b4:/home/workspace# python3.5 app.py | ffmpeg -v warning  
-f rawvideo -pixel_format bgr24 -video_size 1280x720 -framerate 24 -i -  
http://0.0.0.0:3004/fac.frm  
ImportError: numpy.core.multiarray failed to import  
Traceback (most recent call last):  
  File "app.py", line 4, in <module>  
    import cv2  
ImportError: numpy.core.multiarray failed to import  
I tried  
pip3 install numpy --upgrade  
pip3 install -U opencv-python  
and moving numpy import prior to cv import  
but that didn't resolve the error ?
```

Ans :- For others the video and text differ. The video at 1:20 shows port 1883 (but also mentions port 3001-3004 port restriction in the environment) while the text lists 3001. The video also shows `python3.5` (which doesn't work) vs `python3` as the first part of the command. You have to change the port to the one mentioned in the class in the code that you have written .

5. I already did the npm install but when I run the node `./server.js` I get this error → `throw err ; Error : cannot find module 'mosca'`?

Ans : Reset the workspace (this also worked for some)

Or to fix this issue install mosca by doing:

`npm install mosca`

NOTE: you have to run the command in the web service directory, that is in "webservice"

6. In the exercise about processing model outputs, the reason we do: `timestamp = counter / 30` is because the video is 30 fps?

Ans : 30 frames per second, dividing the counter gives us number of seconds. This is because `cv2.VideoCapture` processes its input one frame at a time. Here's the relevant part from the instructions:

Note: It's important to consider whether you really want to output a warning every single time both pets are on-screen - is your warning helpful if it restarts every 30th of a second, with a video at 30 fps?

7. `cv2.VideoCapture()` can be used both with images and videos ?

```
pipe:: Invalid data found when processing input
Traceback (most recent call last):
  File "app.py", line 151, in <module>
    main()
  File "app.py", line 147, in main
    infer_on_video(args, model)
  File "app.py", line 131, in infer_on_video
    sys.stdout.buffer.write(out_frame)
BrokenPipeError: [Errno 32] Broken pipe
```

Ans : yes we can, for images you can also use `cv2.imread`. `videoCapture()` can be used for video capturing from video files, image sequences or cameras.

Ans : Here you need to use some arguments that are not in the instructions in the exercise. Try this: `python app.py | ffmpeg -v warning -f rawvideo -pixel_format bgr24 -video_size 1280x720 -framerate 24 -i - http://0.0.0.0:3004/fac.ffmpeg`
I don't know if we need the `-v` one, but the rest is to define the format of the video and the `-i` is for configuration of the ffmpeg server

8. Am always getting `BrokenPipeError: [Errno 32] Broken pipe` when trying to start the actual application. This occurs at `sys.stdout.buffer.write(out_frame)`. Any suggestions?

Ans :- Use **-f rawvideo** argument for ffmpeg

9. while inputting for test_video I get the following error. Please help me to solve this?

```
(venv) root@d7920ed6cdd7:/home/workspac
e# python app.py -i test_video.mp4
OpenCV: FFMPEG: tag 0x47504a4d/'MJPG' i
s not supported with codec id 8 and for
mat 'mp4 / MP4 (MPEG-4 Part 14)'
OpenCV: FFMPEG: fallback to use tag 0x0
000006c/'l???'
(venv) root@d7920ed6cdd7:/home/workspac
e#
```

Ans :- change your video output file (out variable) to the following, may be you used MAC style instead of linux

Create a video writer for the output video

The second argument should be `cv2.VideoWriter_fourcc('M','J','P','G')`

on Mac, and `0x00000021` on Linux

out = cv2.VideoWriter('out.mp4', 0x00000021, 30, (width,height))

In addition to this, because our workspaces are Linux based workstations, you'll also need to use stack frame you get from frame = cv2.Canny(frame, width, height) using frame = np.dstack((frame, frame, frame)) command line.

Also, make sure you have ffmpeg and ui workspace working in the terminals

10. out = cv2.VideoWriter('out.mp4', 0x00000021, 30, (100,100)), What does the 30 stand for? Is it fps?

Ans:- Yes it is FPS , To perceive motion in video you need minimum 24 FPS but min FPS requirement is very subjective and depends on content and viewer's perception. For e.g. gaming require higher FPS (60) to have good experience . See this article

<https://www.techsmith.com/blog/frame-rate-beginners-guide/>

11. In opencv exercise I got "mjpg is not supported" error. What am I doing wrong here?

Ans :- If you are using linux system then for cv2.VideoWriter you have to use 0x00000021 instead of cv2.VideoWriter_fourcc .

12. how could one retrieve accidentally deleted files such as test videos, within the workspace?

Ans:- There is a menu->backup/reset option on the left bottom corner of the workspace.



13. In the cat and dog exercises I'm trying to put warning text on video frames and save the video as mp4 file. I'm using cv2.putText but I can only see the last frame in the whole video while I save it as mp4. I use cv2 out.write(frame) at end of the Inference output to save as video file

Ans:- I guess you should open the video Writer only once and the write the different frames while you are looping to get each input frame.

If instead the videoWriter is inside the loop, you would rewrite the video and have only the last frame saved!

14. How to play a video/image on Udacity workspace without downloading (Tutorial - no sound)

Ans:- [Tutorial Video Link, Click to open](#)

```
from IPython.display import Video
```

```
Video("test_video.mp4")
```

Docs for Video:

<https://ipython.readthedocs.io/en/stable/api/generated/IPython.display.html#IPython.display.Video>

You may do similar for images:

```
from IPython.display import Image
```

```
Image("test_image.jpg")
```

Docs for Image:

<https://ipython.readthedocs.io/en/stable/api/generated/IPython.display.html#IPython.display.Image>

15. I have working video stream and mqtt server receives events about detected objects but I see empty web page.

Ans:- You have not done the step of upgradation before: `npm install -g npm` to upgrade to latest version of npm.

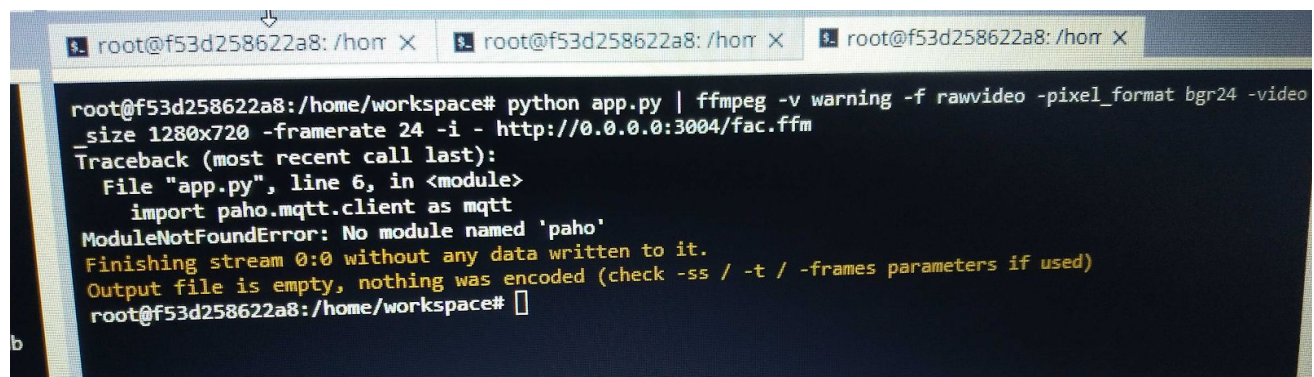
16. pipe:: Invalid data found when processing input, I can't stream the video in the Server Communications exercise

Ans :- You need to pass -f rawvideo -pixel_format bgr24 to ffmpeg

17. The masked output file in the directory - that is not used by the app as far as I can tell, correct? It's just a reference to show us what the masking operation looks like?

Ans :- If you are referring to out_example.mp4 file in Exercise 13, then yes. It is not used by application. It is meant to show how the output will look like.
(Or maybe course content creators forgot to delete it after completing their experiments. Who knows.)

18.

A screenshot of a terminal window with three tabs. The active tab shows a command prompt where a Python script is being run with ffmpeg. The command is: `python app.py | ffmpeg -v warning -f rawvideo -pixel_format bgr24 -video_size 1280x720 -framerate 24 -i - http://0.0.0.0:3004/fac.ffm`. The output shows a traceback error: `File "app.py", line 6, in <module> import paho.mqtt.client as mqtt` followed by `ModuleNotFoundError: No module named 'paho'`. Below the error, it says `Finishing stream 0:0 without any data written to it.` and `Output file is empty, nothing was encoded (check -ss / -t / -frames parameters if used)`. The prompt returns to `root@f53d258622a8:/home/workspace#`.

Ans :- Try type `source /opt/intel/opencvino/bin/setupvars.sh -pyver 3.5`. And then run your cmd again!! Also, declare `→ import paho.mqtt.client as mqtt`
Check the terminal that run mosca server. Make sure MQTT_PORT is set to 3001

19.

```
[setupvars.sh] OpenVINO environment initialized
(venv) root@2d2ec6ee2e21:/home/workspace# python app.py -i blue-car.jpg
Traceback (most recent call last):
  File "app.py", line 82, in <module>
    main()
  File "app.py", line 78, in main
    capture_stream(args)
  File "app.py", line 66, in capture_stream
    if key_pressed == 27:
NameError: name 'key_pressed' is not defined
(venv) root@2d2ec6ee2e21:/home/workspace#
```

Ans:- Make sure you have defined `key_pressed = cv2.waitKey(60)`. you can define it anywhere before line 66. may be after these lines of code

```
capture = cv2.VideoCapture(input_stream)
capture.open(args.input)
```

20. here's a query. how can we deploy the gaze estimation model??? there are three different input ?? how do I go about it ??

Ans:- It seems that the gaze estimation is not an easy one. Yes you have 3 inputs, one for an image of left eye, one for right eye and one for the 3 angles pitch, yaw and roll of the head pose.

You need to do inference with other models to build these 3 inputs.

There is a demo that does gaze estimation and that doc explains what models to use

(https://docs.openvinotoolkit.org/2019_R3.1/_demos_gaze_estimation_demo_README.html).

21. FFMPEG: fallback to use tag 0x0000006c/'???'

```
root@fcef5b5c8354: /home/w

frame = cv2.Canny(fr,100,200)
NameError: name 'fr' is not defined
(venv) root@fcef5b5c8354:/home/workspace# python app.py -i test_video.mp4
OpenCV: FFMPEG: tag 0x47504a4d/'MJPG' is not supported with codec id 8 and format 'mp4 / MP4 (MPEG-4 Part 14)'
OpenCV: FFMPEG: fallback to use tag 0x0000006c/'l???'
(venv) root@fcef5b5c8354:/home/workspace#
```

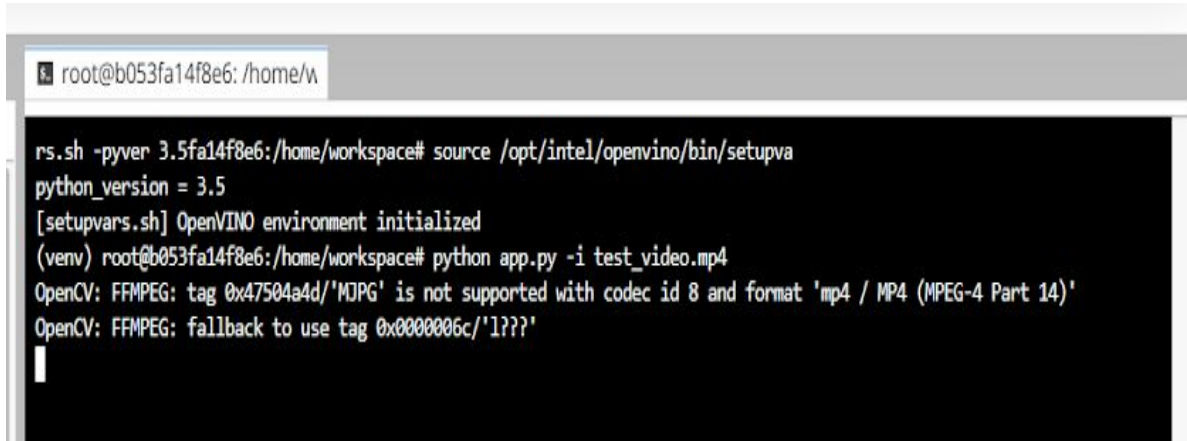
Ans:- You have to add `frame = np.dstack((frame, frame, frame))` after adding Canny Edge Detection to the frame. Also the correct syntax for Linux is: `out = cv2.VideoWriter('out.mp4', 0x00000021, 30, (100,100)) ...` Don't forget (Ctrl+s) to save for any changes and to delete the old out.mp4.

NOTE :- If you got connection refused error then make sure the source running environment the VENV is for final command

`python app.py | ffmpeg -v warning -f rawvideo -pixel_format bgr24 -video_size 1280x720 -framerate 24 -i - http://0.0.0.0:3004/fac.ffmpeg`

this one rest will be on simple root terminal keep an eye before running command you may get error

22.



```
root@b053fa14f8e6: /home/v
rs.sh -pyver 3.5fa14f8e6:/home/workspace# source /opt/intel/opencvino/bin/setupva
python_version = 3.5
[setupvars.sh] OpenVINO environment initialized
(venv) root@b053fa14f8e6:/home/workspace# python app.py -i test_video.mp4
OpenCV: FFMPEG: tag 0x47504a4d/'MJPG' is not supported with codec id 8 and format 'mp4 / MP4 (MPEG-4 Part 14)'
OpenCV: FFMPEG: fallback to use tag 0x0000006c/'l???'
```

Ans:- use this line `out_video = cv2.VideoWriter(str(out_file), 0x00000021, 30, (100,100))` . It is explained in the solution . On Mac, `cv2.VideoWriter` uses `cv2.VideoWriter_fourcc('M','J','P','G')` to write an .mp4 file, while Linux uses `0x00000021`.

Since , our workspace uses LINUX then use the LINUX one .

Well there is 2nd modif that cannot be guessed without the solution:

On Mac, the output with the given code on using Canny Edge Detection will run fine.

However, on Linux, you'll need to use `np.dstack` to make a 3-channel array to write back to the out file, or else the video won't be able to be opened correctly: `frame = np.dstack((frame, frame, frame))`

23. My code worked but why the video and image barely showed

Ans :- It is because of the `cv2.resize` to (100,100) we are asked to do for. (100,100) is quiet small. You can try to change these values to see a change in your videos

24. `cv2.VideoWriter_fourcc('M','J','P','G')` what is meaning of this syntax and why we use it ?

Ans :- VideoWriter() needs as 2nd argument a 4-character code of codec used to compress the frames. A FourCC ("four-character code") is a sequence of four bytes (typically ASCII) used to uniquely identify data formats. I think 0x00000021 stands for H264. It is defined in the source of FFmpeg { AV_CODEC_ID_H264, 0x21 },
<https://git.videolan.org/?p=ffmpeg.git;a=blob;f=libavformat/isom.c>

25. What is the meaning of 60 in below syntax ?

```
key_pressed = cv2.waitKey(60)
```

Ans:- waitKey wait for an event (like a keypress) for 60 milliseconds max. If an event has occurred before the call or occurs during the call, it immediately returns. Otherwise it returns after 60 ms.

26. Can someone please help me with this error...Stackoverflow doesn't have answers

SW used: `<module 'opencv' from
'/opt/intel/opencv_2019.3.376/python/python3.7/opencv/__init__.py'>
cv2 = '4.1.2-opencv'`
Note the code works well on the Udacity workspace but not on my PC ?

Ans :- To install opencv, you have to follow the guide
https://docs.opencv.org/latest/docs_install_guides_installing_opencv_linux.html . In your error msg, I see:
/home/jenkins/workspace/OpenCV/OpenVINO/build/opencv/modules/videoio/src/cap_gstreamer.cpp
Make sure you have compiled your own version of opencv. From
<https://stackoverflow.com/questions/12334925/how-combine-gstreamer-and-opencv> seems like opencv isn't compatible with my gstreamer.
In future, I will run opencv from a docker container...Simple.After reading the opencv docs, here is how I fixed it...

I needed to setup the correct codec for gstreamer and opencv
See: <http://www.fourcc.org/codecs.php>.

27. What went wrong?

```
(venv) root@ea46cf91517a:/home/workspace/web/service/server/node-server# node ./server.js
{"pid":2785,"hostname":"ea46cf91517a","name":"mosca","level":50,"time":1578846617868,"msg":"Error starting Mosca Server",
"v":1}
events.js:170
    throw er; // Unhandled 'error' event
    ^

Error: listen EADDRINUSE: address already in use :::3001
    at Server.setupListenHandle [as _listen2] (net.js:1259:14)
    at listenInCluster (net.js:1307:12)
    at Server.listen (net.js:1395:7)
    at /home/workspace/web/service/server/node_modules/mosca/lib/server.js:225:16
    at makeCall (/home/workspace/web/service/server/node_modules/fastseries/series.js:119:7)
    at NoResultsHolder.release (/home/workspace/web/service/server/node_modules/fastseries/series.js:67:9)
    at series (/home/workspace/web/service/server/node_modules/fastseries/series.js:39:14)
    at Object.eachSeries (/home/workspace/web/service/server/node_modules/steed/steed.js:47:5)
    at /home/workspace/web/service/server/node_modules/mosca/lib/server.js:211:13
    at makeCall (/home/workspace/web/service/server/node_modules/fastseries/series.js:117:7)
    at ResultsHolder.release (/home/workspace/web/service/server/node_modules/fastseries/series.js:96:9)
    at /home/workspace/web/service/server/node_modules/mosca/lib/server.js:204:9
    at makeCall (/home/workspace/web/service/server/node_modules/fastseries/series.js:117:7)
    at ResultsHolder.release (/home/workspace/web/service/server/node_modules/fastseries/series.js:96:9)
    at /home/workspace/web/service/server/node_modules/ascoltatori/lib/ascoltatori.js:93:9
    at TrieAscoltatore.<anonymous> (/home/workspace/web/service/server/node_modules/ascoltatori/lib/abstract_ascoltatore.js:61:7)
    at TrieAscoltatore.emit (events.js:193:13)
    at _addListener (events.js:219:14)
    at TrieAscoltatore.addListener (events.js:267:10)
```

Ans:- It means there is another program is using this port 3001. Have you open 2 terminal that runs the same mosca server? If Yes, Try kill any node process and run again.

To list running node process: `ps -e| grep node`

After this, you will get :-

(venv) root@ea46cf91517a:/home/workspace# ps -e|grep node

1407 pts/1 00:00:00 node

1431 pts/2 00:00:00 node

1438 pts/2 00:00:08 node

This means that you have killed the another process. Now no error !!

28.

```
libswresample  1.  2.101 / 1.  2.101
libpostproc    53.  3.100 / 53.  3.100
pipe:: Invalid data found when processing input
Traceback (most recent call last):
  File "app.py", line 143, in <module>
    main()
  File "app.py", line 139, in main
    infer_on_video(args, model)
  File "app.py", line 122, in infer_on_video
    sys.stdout.buffer.write(out_frame)
BrokenPipeError: [Errno 32] Broken pipe
(venv) root@ea46cf91517a:/home/workspace#
```

Ans :- Try this command to run → `python app.py | ffmpeg -f rawvideo -pixel_format bgr24 -video_size 1280x720 -framerate 25 -i - http://0.0.0.0:3004/fac.ffm`

NOTE :-

Bugs and mistakes you might encounter:

Make sure you add - after -i flag while executing the command.

Passing an image directly into the `sys.stdout.buffer.write()` . I forget to convert it using `tostring()` method.

Finally, while passing argument to the `ffmpeg` I need to add some extra arguments to make it work for me. Details in the link <https://stackoverflow.com/a/5839058> .

UPDATE:

While watching the solution video, It seems like the conversion mentioned in pt 2 is not necessary. I think the main problem was the pt 3 in my case.

29.

```
(venv) root@6502f71b22b7:/home/workspace# python app.py | ffmpeg -v warning -f rawvideo -pixel_format bgr24 -video_size 1280x720 -framerate 24 -i - http://0.0.0.0:3004/fac.ffm
Traceback (most recent call last):
  File "app.py", line 146, in <module>
    main()
  File "app.py", line 142, in main
    infer_on_video(args, model)
  File "app.py", line 74, in infer_on_video
    client.publish(topic, json.dumps({"stat_name": statistic}))
NameError: name 'statistic' is not defined
Output file is empty, nothing was encoded (check -ss / -t / -frames parameters if used)
(venv) root@6502f71b22b7:/home/workspace#
```

Ans:- You need to write down the stats that you want to publish.

this has to be done :-

```
client.publish("class", json.dumps({"class_names": class_names}))
```

```
client.publish("speedometer", json.dumps({"speed": speed}))
```

30. how to fix this?

Exercise: Server Communications

```
app.py  server.js
24  MQTT_HOST = IPADDRESS
root@ef273908124a:/home/workspace/websevice/ui# npm run dev
npm WARN Local package.json exists, but node_modules is missing, did you mean to install?
npm ERR! A complete log of this run can be found in:
npm ERR! /root/.npm/_logs/2020-01-13T14_55_07_898Z-debug.log
(venv) root@ef273908124a:/home/workspace/websevice/ui# npm run dev
> vehicle-edge-app@0.1.0 dev /home/workspace/websevice/ui
> cross-env NODE_ENV=development webpack-dev-server --history-api-fallback --watch --hot --inline
sh: 1: cross-env: not found
npm ERR! file sh
npm ERR! errno ENOENT
npm ERR! syscall spawn
npm ERR! vehicle-edge-app@0.1.0 dev: `cross-env NODE_ENV=development webpack-dev-server --history-api-fallback --watch --hot --inline`
npm ERR! spawn ENOENT
npm ERR!
npm ERR! Failed at the vehicle-edge-app@0.1.0 dev script.
npm ERR! This is probably not a problem with npm. There is likely additional logging output above.
npm WARN Local package.json exists, but node_modules missing, did you mean to install?
npm ERR! A complete log of this run can be found in:
npm ERR! /root/.npm/_logs/2020-01-13T14_56_07_927Z-debug.log
(venv) root@ef273908124a:/home/workspace/websevice/ui#
```


Ans :- run npm install in webserver path. Do the same for webserver/ui.

Eg. `cd webserver/ui`
`npm install`

31. I am trying to show the frames in the cat & dog exercise on the screen like this:

```
# Display the resulting frame  
cv2.imshow('frame',p_frame)
```

I get an error:

```
Gtk-WARNING **: cannot open display
```

When I remove the code for displaying it everything works fine. Is this some error related to the Udacity workspace?

Ans: - You can't use this method in workspace, since it shows GUI windows using gtk library. As everybody said we can't, atleast directly. But You can utilize Jupiter notebook functionalities. First sourceenv.

Now,

In your workspace:

-go to> File>New>Notebook

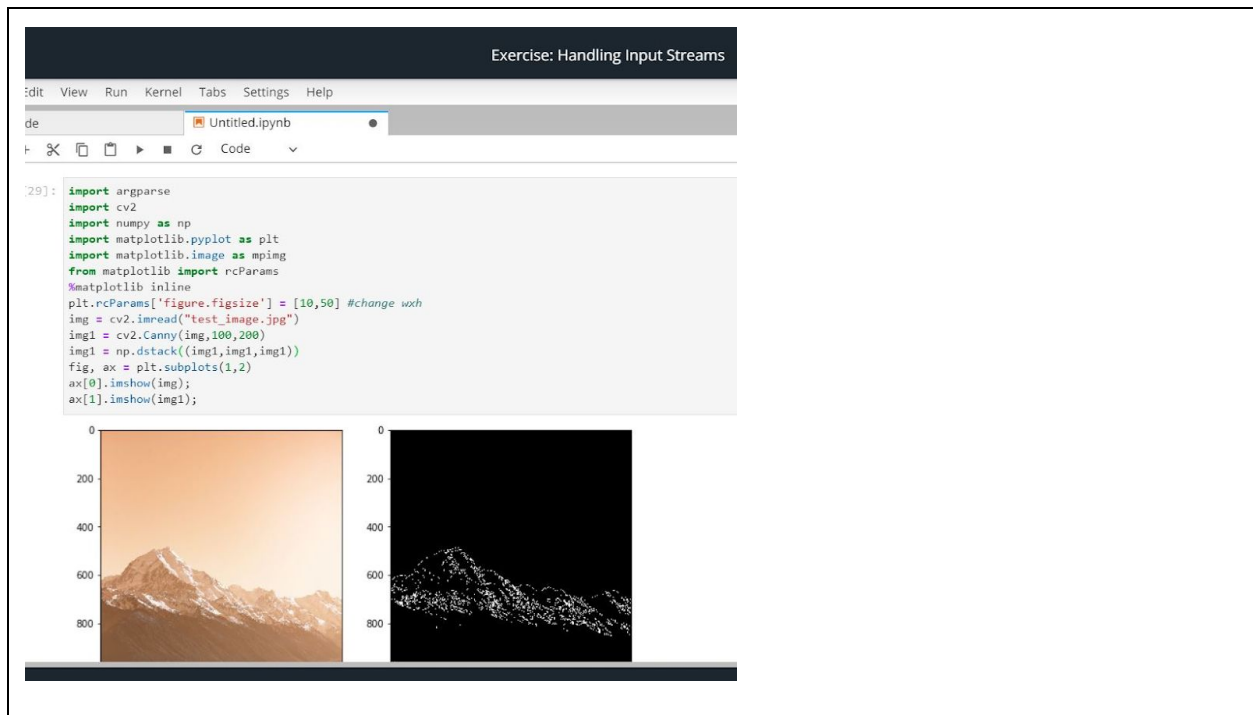
-select python3

-now use matplotlib library and do your research.

(without arguments, this is just for quick outputs to avoid frequent downloads/uploads)

Once you complete your research copy past code in app.py and perform args as per given task.

You can also play video with lpython library.



NOTE :- first exercise "Handling Input Streams".

I observed that I thought

`cap.isOpened()` would handle the absence of next frame and automatically break the while loop but No. The `ret, frame = cap.read()` was needed here.

32. can anyone explain me the purpose and syntax of

```
frame = np.dstack((frame, frame, frame)) ?
```

'cause even the instructor forgot it and as per the docs, it should be

Parameters: tup : sequence of arrays

The arrays must have the same shape along all but the third axis. 1-D or 2-D arrays must have the same shape.

Returns:stacked : ndarray

The array formed by stacking the given arrays, will be at least 3-D.

Any ideas why?

Ans:- `frame = np.dstack((frame, frame, frame))` is for converting a 1 channel image to a 3 channel image by stacking array in sequence depth wise, like a RGB image. However, when you use `cv2.imwrite('image_name.jpg', frame)` to save the frame as a jpg image, the image is saved as a 3 channel image. Hence, it does not matter if you stack or not the image. Try to read the output image by using and not using `dstack` and you will not find any difference.

When you convolved `cv2.Canny` filter on the image what you got was a 1channel grayscale image but to write output with `opencv`, you need to have a 3channel image, that is where `np.dstack` comes in, `*frame = np.dstack((frame, frame, frame))*` will take your one channel image and convert it to a 3 channel image by stacking the arrays on each other.

33. I am getting this error :-

(venv) root@6b6d9500d4f5:/home/workspace# python app.py -i blue-car.jpg
Traceback (most recent call last):

File "app.py", line 74, in <module>

main()

File "app.py", line 70, in main

capture_stream(args)

File "app.py", line 26, in capture_stream

elif args.i.endswith('.jpg') or args.i.endswith('.bmp'):

AttributeError: 'str' object has no attribute 'endswitch'

Ans:- There is a typo. Replace `endswitch` by `endswith`.

now these is another error

File "app.py", line 50, in capture_stream

`frame = cv2.Canny(frame, (100, 200))`

`TypeError: Required argument 'threshold1' (pos 3) not found.`

For this Replace by `:frame = cv2.Canny(frame, 100, 200)` that is remove `()`

34. I am getting error in **Exercise: Server Communications !! any fix ? error is ModuleNotFoundError: No module named 'openvino'**

Ans:- try run this cmd
`source /opt/intel/openvino/bin/setupvars.sh -pyver 3.5`

NOTE:-

Tutorial for L5: How to show image in Udacity workspace:

If you want to learn opencv without local setup then you can follow this method.

We will Utilize Jupiter notebook functionalities.

1.First sourceenv.

2.In your workspace:

-go to> File>New>Notebook

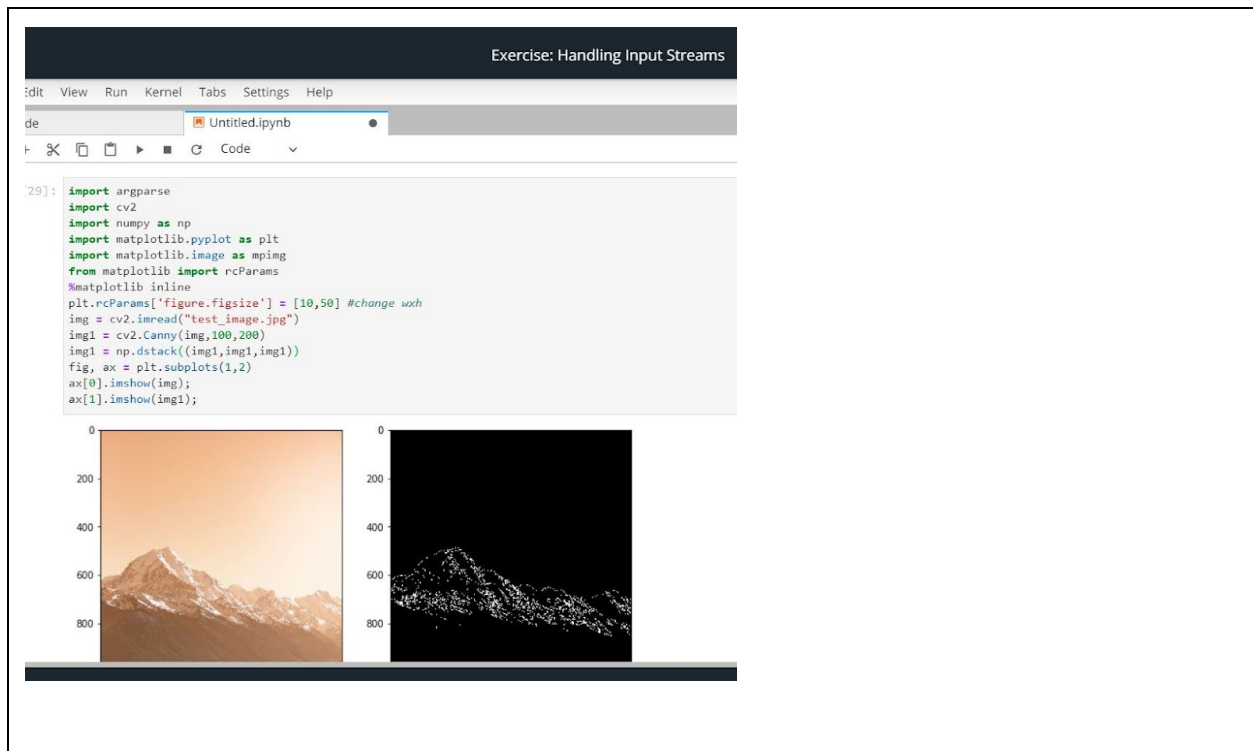
-select python3

3.Now use matplotlib library and do your research.

(without arguments, this is just for quick outputs to avoid frequent downloads/uploads)

You can also play video with lpython library.

4. Code: See Image below.



35. if result[0][1] == 1 and not incident_flag:

Can someone help to explain this line?

Ans :- the model produces outputs of shape (1,3) but i guess the second result is what we are concerned with when the output is 1 that means the cat and the dog2 are in together. also the not incident_flag is just to check the incident flag, the code started by setting it to False so if the output of result is one and (not False == True) then execute the code that follow. Here for (1, 3), First of all it means the tensor is a 2dimensional tensor, also it has one row and 3 columns.

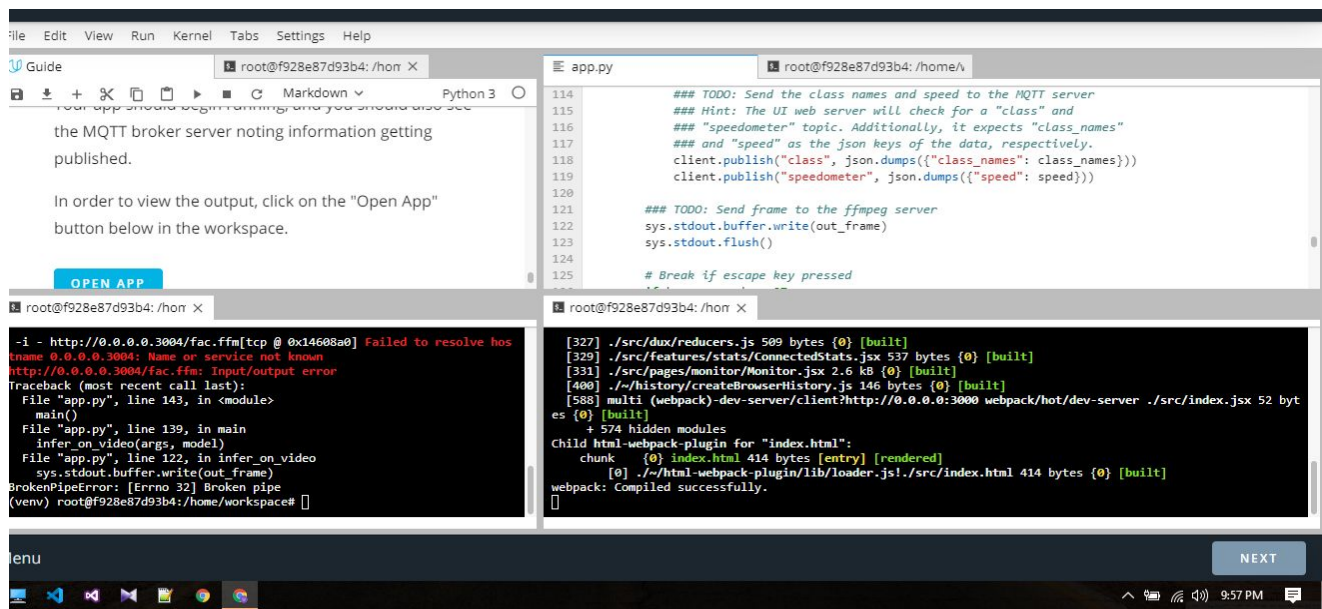
36. Hey guys on I5 exercise - 7 i'm getting incident at 0.00 seconds.. anyone know why?

Ans:- Make sure you increment the counter in your code .

37. Why might it still be useful to be streaming video back to another server, given AI applied at the edge?

Ans:- Let's imagine a security camera: You don't want to stream every single second that is captured to a server (because it would be expensive to do so). But if persons are detected within it (by the edge application) you might want to stream it to a server in case this person is trying to enter to your house, so you have footage to proof it later on.

38. Any hint for this error?



```
File Edit View Run Kernel Tabs Settings Help
Guide
root@f928e87d93b4: /home/ X
Python 3
the MQTT broker server noting information getting
published.
In order to view the output, click on the "Open App"
button below in the workspace.
OPEN APP
root@f928e87d93b4: /home/ X
-i - http://0.0.0.0:3004/fac.ffm[tcp @ 0x14608a0] Failed to resolve hos
tname 0.0.0.0:3004: Name or service not known
http://0.0.0.0:3004/fac.ffm: Input/output error
Traceback (most recent call last):
  File "app.py", line 143, in <module>
    main()
  File "app.py", line 139, in main
    infer_on_video(args, model)
  File "app.py", line 122, in infer_on_video
    sys.stdout.buffer.write(out_frame)
BrokenPipeError: [Errno 32] Broken pipe
(venv) root@f928e87d93b4: /home/workspace#
app.py
root@f928e87d93b4: /home/ X
114     """ TODO: Send the class names and speed to the MQTT server
115     """ Hint: The UI web server will check for a "class" and
116     """ "speedometer" topic. Additionally, it expects "class_names"
117     """ and "speed" as the json keys of the data, respectively.
118     client.publish("class", json.dumps({"class_names": class_names}))
119     client.publish("speedometer", json.dumps({"speed": speed}))
120
121     """ TODO: Send frame to the ffmpeg server
122     sys.stdout.buffer.write(out_frame)
123     sys.stdout.flush()
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125     # Break if escape key pressed
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```

Ans :- Use 0.0.0.0:3004 instead of 0.0.0.0.3004

FAQs For Lesson - 4

IMPORTANT NOTE:-

Don't Forget to Click That Source Env Button (Blue Button) of the workspace

Most of the time, Error occurs because you have not pressed it !!

[If you have pressed it & still getting the error then move further to see other reasons for your error]

1.

```
python_version = 3.5
[setupvars.sh] OpenVINO environment initialized
(venv) root@453a8f653e1f:/home/workspace# python app.py -m "/home/workspace/models/frozen_inference_graph.xml"
-c "GREEN" -ct "0.6"
usage: Run inference on an input video [-h] -m M [-i I] [-d D]
Run inference on an input video: error: unrecognized arguments: -c GREEN -ct 0.6
(venv) root@453a8f653e1f:/home/workspace# source /opt/intel/openvino/bin/setupvars.sh -pyver 3.5
python_version = 3.5
[setupvars.sh] OpenVINO environment initialized
(venv) root@453a8f653e1f:/home/workspace# python app.py -m "/home/workspace/models/frozen_inference_graph.xml"
-c "GREEN" -ct "0.6"
usage: Run inference on an input video [-h] -m M [-i I] [-d D]
Run inference on an input video: error: unrecognized arguments: -c GREEN -ct 0.6
(venv) root@453a8f653e1f:/home/workspace#
```

Ans:-

Try to pass -ct and -c without double quote.

Eg. python app.py -ct 0.6 -c BLUE.

You need to put optional.add_argument for -c and -ct

Eg. optional.add_argument("-c",....

2. Does anyone get the below error?

```
root@98ce03d13720: /home/
t_v2_coco_2018_03_29/frozen_inference_graph.xml -ct 0.6 -c BLUEpace/ssd_mobilenet
Traceback (most recent call last):
  File "app.py", line 3, in <module>
    from inference import Network
  File "/home/workspace/inference.py", line 10, in <module>
    from opencv.inference_engine import IENetwork, IECore
ModuleNotFoundError: No module named 'opencv'
root@98ce03d13720: /home/workspace#
```

Ans: click on the Source Env button upon loading the workspace

```
Traceback (most recent call last):
  File "solution/app.py", line 111, in <module>
    main()
  File "solution/app.py", line 107, in main
    infer_on_video(args)
  File "solution/app.py", line 91, in infer_on_video
    frame = draw_boxes(frame, result, args, width, height)
  File "solution/app.py", line 40, in draw_boxes
    conf = box[2]
IndexError: index 2 is out of bounds for axis 0 with size 1
(yerv) root@98ce03d13720: /home/workspace#
```

3.

Ans:- # Usage:

Download the correct model for vehicle detection

\$ /opt/intel/opencv/deployment_tools/open_model_zoo/tools/downloader/downloader.py
--name ssd_mobilenet_v2_coco

Convert tf model to IR

\$ python /opt/intel/opencv/deployment_tools/model_optimizer/mo.py --input_model
frozen_inference_graph.pb --tensorflow_object_detection_api_pipeline_config pipeline.config
--reverse_input_channels --tensorflow_use_custom_operations_config

```
/opt/intel/opencvino/deployment_tools/model_optimizer/extensions/front/tf/ssd_v2_support.json
# Run inference and generate output.mp4
# $ python solution/app.py -i test_video.mp4 -m
/home/workspace/public/ssd_mobilenet_v2_coco/ssd_mobilenet_v2_coco_2018_03_29/frozen_inference_graph.xml
```

4. I understand that the method `os.path.splitext(model_xml)` splits the pathname (`model_xml`) into a pair. I need some clarification on what is contained in this path because my expectation is the `.xml` file

Ans : We are providing the XML path through `-m` argument. We also need to specify `.bin` file as network requires architecture (`.xml`) and weights (`.bin`) so it is splitting the `.xml` file into `model_name.xml` and `model_name.bin`

5. `model_bin = os.path.splitext(model_xml)[0] + ".bin"`, what does this do?

ANS:-

It replaces the `".xml"` extension in the model file name by `".bin"`. `model_xml` points to the model xml file, and now `model_bin` points to the model bin file.

`[0]` specifies the first part of the path. Everything before `.XML` is under `[0]`.

```
1 print(os.path.splitext("/home/workspace/filename.xml"))
2 print(os.path.splitext("/home/workspace/filename.xml")[0])
3 print(os.path.splitext("/home/workspace/filename.xml")[0]+".bin")
```

```
(' /home/workspace/filename', '.xml')
/home/workspace/filename
/home/workspace/filename.bin
```

6. Did not understand this one bit of it

```
unsupported_layers = [l for l in net.layers.keys() if l not in supported_layers]

if len(unsupported_layers) != 0:

    print("Unsupported layers found: {}".format(unsupported_layers))

    print("Check whether extensions are available to add to IECore.")

    exit(1)
```

Ans :- Line 1 compares all layers of the model (net.layers.keys()) with the built in supported layers list. If any player is not in this list, it is appended to the unsupported layers list.

If there are any unsupported layers found, the if statement prints out the unsupported layers list we made above and exits the program.

The logic behind the first line:

```
unsupported_layers = [l for l in net.layers.keys() if l not in supported_layers]
```

can be described as:

for each item in net.layer.keys(), search if it exists in the supported_layers. If it does not exist in the supported_layers, then append it to the unsupported_layers.

The next line:

```
if len(unsupported_layers) != 0:
```

If there is at least one item in the unsupported_layers (if unsupported_layers is empty then the length will be zero), then there is at least one unsupported layer.

```
[setupvars.sh] OpenVINO environment initialized
(venv) root@f8f123cd9aa6:/home/workspace# python app.py -m "/home/workspace/models/frozen_inference_graph.xml" -ct "0.6" -c "GREEN"
Traceback (most recent call last):
  File "app.py", line 122, in <module>
    main()
  File "app.py", line 118, in main
    infer_on_video(args)
  File "app.py", line 70, in infer_on_video
    plugin.load_model(args.m, args.d, CPU_EXTENSION)
  File "/home/workspace/inference.py", line 44, in load_model
    self.network = IENetwork(model=model_xml, weights=model_bin)
  File "ie_api.pyx", line 410, in opencv.inference_engine.ie_api.IENetwork.__cinit__
Exception: Path to the model /home/workspace/models/frozen_inference_graph.xml doesn't exist
s or it's a directory
(venv) root@f8f123cd9aa6:/home/workspace#
```

7.

Ans:-

follow these steps to download the frozen_inference_graph.xml :-

1. wget

http://download.tensorflow.org/models/object_detection/ssd_mobilenet_v2_coco_2018_03_29.tar.gz

2. use tar -xvf command with the downloaded file to unpack it into the ssd_mobilenet_v2_coco_2018_03_29 folder

3. python /opt/intel/opencvino/deployment_tools/model_optimizer/mo.py --input_model frozen_inference_graph.pb --tensorflow_object_detection_api_pipeline_config pipeline.config --reverse_input_channels --tensorflow_use_custom_operations_config /opt/intel/opencvino/deployment_tools/model_optimizer/extensions/front/tf/ssd_v2_support.json

4. python app.py -m ssd_mobilenet_v2_coco_2018_03_29/frozen_inference_graph.xml -c BLUE -ct 0.6

8. What is this accessing exactly

```
status = exec_net.requests[0].wait(-1)
```

```
Input_blob = next(iter(exec_net.inputs)) do ??
```

Ans :-

status = exec_net.requests[0].wait(-1) : we are just waiting for the previous async request to finish.

And input_blob = next(iter(exec_net.inputs)) is the name of the input layer.

exec_net.inputs is a python dictionary that maps input layer names to InputInfo objects (from doc). The syntax next(iter(dic)) is particular to python. It returns a key of the dictionary 'dic'. In the exercise, our model has only one input layer. So next(iter(exec_net.inputs)) return the name of that unique input layer.

-1 means that it is a blocking wait. The call does not return until the requests is finished.

If you use wait(0) instead, the call will immediately return even if the requests is not finished. And depending on the value of status, you will if it is finished or not.

9. python: can't open file 'test.py': [Errno 2] No such file or directory

```
(venv) root@5561fd69e212:~# ls
```

```
(venv) root@5561fd69e212:~# python test.py
```

```
python: can't open file 'test.py': [Errno 2] No such file or directory
```

Ans :-

The error means it cannot find the file test.py in your current directory. Every time you run the command python you must be at the exact directory of the file to run python test.py, which in your case you were not at that directory /home/workspace or add the exact directory to the file in order to successfully run the python command such as python /home/workspace/test.py

10. IndexError: index 2 is out of bounds for axis 0 with size

1

Ans:-

create the

```
args.c = convert_color(args.c)
```

```
args.ct = float(args.ct) in the def infer_on_video(args)
```

And make this change from (0, 0, 255) to args.c, so you are getting the color you use in the command rather than a defaulting it to (0,0,255).

Use vehicle detection pre-trained models such as frozen_inference_graph.xml or vehicle-detection-adas-0002.xml rather than

vehicle-attributes-recognition-barrier.0039.xml. I am not sure if the vehicle-attributes-recognition-barrier.0039.xml has the correct weights and bounds.

11.

```
plugin.load_model(args.m, args.d, CPU_EXTENSION)
File "/home/workspace/inference.py", line 44, in load_model
    self.network = IENetwork(model=model_xml, weights=model_bin)
File "ie_api.pyx", line 410, in openvino.inference_engine.ie_a
pi.IENetwork.__cinit__
Exception: Path to the model frozen_inference_graph.xml doesn't
exists or it's a directory
(venv) root@50d9aa4e7a52:/home/workspace# python app.py -m froze
n_inference_graph.xml -ct 0.6 -c
usage: Run inference on an input video [-h] -m M [-i I] [-d D]
Run inference on an input video: error: unrecognized arguments:
-ct 0.6 -c
(venv) root@50d9aa4e7a52:/home/workspace#
```

Ans:-

The error means you haven't added the arguments ct and c in your python script. Add them and then try

add these lines : c_desc = "The color of the bounding boxes to draw; RED, GREEN or BLUE"

ct_desc = "The confidence threshold to use with the bounding boxes"

12.

```
root@f684e6b87de3:/home/v
Traceback (most recent call last):
  File "/home/workspace/feed_network.py", line 63, in <module>
    main()
  File "/home/workspace/feed_network.py", line 59, in main
    load_to_IE(args.m)
  File "/home/workspace/feed_network.py", line 33, in load_to_IE
    ie_core.add_extension(CPU_EXTENSION, "GPU")
  File "ie_api.pyx", line 118, in openvino.inference_engine.ie_api.IECore.add_extension
RuntimeError: Device with "GPU" name is not registered in the InferenceEngine
(venv) root@f684e6b87de3:/home/workspace#
```

Ans:-

I think you were initializing the IECore with model_xml and that was why it was failing

13. given the definition : `def sync_inference(exec_net, input_blob, image)` : what's the difference between : `input_blob` and `image` as arguments although 'image' means the input image i'm not quite sure what 'input_blob' means and what it held on it ???!

Ans:-

`input_blob` is the name of the input layer of the model. It is the entry point of your model, it is just a string. Each layer in the model has a name. You may find also the `output_blob` (maybe in another exercise), which is the name of the output layer of your model.

14. In the async part In exercise 9 I didn't use the "while true" loop and the test passed, is it necessary? Maybe the task is too small so its finished quickly?

Ans:-

`InferRequest.wait()` will wait until result is ready

15. difference between the "async inference" and "batch inference"?

Ans: -

Async usage can improve overall frame-rate of the application, because rather than wait for inference to complete, the app can continue doing things on the host, while the accelerator is busy. The batch inference is the process of generating predictions on a batch of observations. The batch jobs are typically generated on some recurring schedule (e.g. hourly, daily). These predictions are then stored in a database and can be made available to developers or end-users. A batch inference may sometimes take advantage of big data technologies such as Spark to generate predictions. This allows data scientists and machine learning engineers to take advantage of scalable compute

resources to generate many predictions at once.

IMPORTANT [FREQUENTLY OCCURRING ERROR]:

EXCEPTION : Path to the model

**/home/workspace/models/frozen_inference_graph.xml doesn't exist
or it's a directory**

follow these steps to download the frozen_inference_graph.xml Just enter all the following commands one by one in cmd : -

1. wget

http://download.tensorflow.org/models/object_detection/ssd_mobilenet_v2_coco_2018_03_29.tar.gz

2. use tar -xvf command with the downloaded file to unpack it into the ssd_mobilenet_v2_coco_2018_03_29 folder

3. python /opt/intel/opencvino/deployment_tools/model_optimizer/mo.py
--input_model frozen_inference_graph.pb
--tensorflow_object_detection_api_pipeline_config pipeline.config
--reverse_input_channels --tensorflow_use_custom_operations_config
/opt/intel/opencvino/deployment_tools/model_optimizer/extensions/front/tf/ssd_v2_support.json

4. python app.py -m
ssd_mobilenet_v2_coco_2018_03_29/frozen_inference_graph.xml -c
BLUE -ct 0.6

