

GPU 서버 내에서 학습시키기

제공된 서버에 접속한 후 로그인 한다

실행할 코드 정리

1) OS 설정

```
import os
os.environ["CUDA_DEVICE_ORDER"]="PCI_BUS_ID"
os.environ["CUDA_VISIBLE_DEVICES"]="0"

!nvidia-smi
```

Thu Sep 7 02:02:59 2023

NVIDIA-SMI 515.65.01 Driver Version: 515.65.01 CUDA Version: 11.7									
GPU	Name	Persistence-M	Bus-Id	Disp.A	Volatile	Uncorr.	ECC		
Fan	Temp	Perf	Pwr:Usage/Cap	Memory-Usage	GPU-Util	Compute	M.	MIG	M.
0	Tesla V100-PCI...	On	00000000:03:00.0	Off				0	
N/A	36C	P0	33W / 250W	5688MiB / 32768MiB	0%	Default	N/A		
1	Tesla V100-PCI...	On	00000000:04:00.0	Off				0	
N/A	33C	P0	25W / 250W	9MiB / 32768MiB	0%	Default	N/A		
2	Tesla V100-PCI...	On	00000000:05:00.0	Off				0	
N/A	33C	P0	24W / 250W	9MiB / 32768MiB	0%	Default	N/A		
3	Tesla V100-PCI...	On	00000000:0C:00.0	Off				0	
N/A	32C	P0	23W / 250W	9MiB / 32768MiB	0%	Default	N/A		
4	Tesla V100-PCI...	On	00000000:0D:00.0	Off				0	
N/A	32C	P0	24W / 250W	9MiB / 32768MiB	0%	Default	N/A		
5	Tesla V100-PCI...	On	00000000:14:00.0	Off				0	
N/A	31C	P0	22W / 250W	9MiB / 32768MiB	0%	Default	N/A		

2)

```
!ps -ef | grep 2331
```

```
In [2]: !ps -ef | grep 2331
root      2331      2329    0   2022  tty1      00:02:14 /usr/lib/xorg/Xorg vt1 -displayfd 3 -auth /run/user/122/gdm/Xauthority -background
none      -noreset -keeppty -verbose 3
j-j9a101  798386  704562    0   02:50 pts/5    00:00:00 /bin/bash -c ps -ef | grep 2331
j-j9a101  798388  798386    0   02:50 pts/5    00:00:00 grep 2331
```

3)

```
pwd
```

```
In [3]: pwd
```

```
Out[3]: '/home/j-j9a101'
```

4)

```
!wget -O FIRESMOKE.zip https://universe.roboflow.com/ds/lmAPTIMjGP?key=bjmbmtsGoN
```

```
j: !wget -O FIRESMOKE.zip https://universe.roboflow.com/ds/lmAPTIMjGP?key=bjmbmtsGoN
```

```
--2023-09-07 02:56:46-- https://universe.roboflow.com/ds/lmAPTIMjGP?key=bjmbmtsGoN
Resolving universe.roboflow.com (universe.roboflow.com)... 151.101.1.195, 151.101.65.195
Connecting to universe.roboflow.com (universe.roboflow.com)|151.101.1.195|:443... connected.
HTTP request sent, awaiting response... 302 Found
Location: https://storage.googleapis.com/roboflow-platform-exports/FHhpvopZ81hR0xEerPFtHfm9uL02/ZYoMxH9pIWazM2yGBaQM/1/yolov8.zip?X-Goog-Algorithm=G00G4-RSA-SHA256&X-Goog-Credential=481589474394-compute%40developer.gserviceaccount.com%2F20230907%2Fauto%2Fstorage%2Fgoog4_request&X-Goog-Date=20230907T040622Z&X-Goog-Expires=900&X-Goog-SignedHeaders=host&X-Goog-Signature=034dbcb63679dd175feb5d366004a0a7b595940ae9a68e8b18fb71cfe014046296165da63896fe12b554430a8dda6fb5792ca3188b25cf9d5da3f3562b314c53600d8b68be0ec784b631261c962129ecdc0d90ae30cf73fa906372fa71963f8b8f9280d2020686fc7cd71e2386d121f6721eccc138fc0366313e9785e45b08746daad24352869cd43fc44dd26264d31688d5be8369be1e787c33fc33a0e6c6f75cfd233af7f8db6c4264e8e076c813c06bf63d59bdd040e116fc90ca213f9c2bcd0077e391741bb1ededf1f19baefd018cf6a64f0ac5c9c66c03418d943edf02e99829c3b42001db87ce723a685f925b835f76f2b729988f0a804046c663c7 [following]
--2023-09-07 02:56:47-- https://storage.googleapis.com/roboflow-platform-exports/FHhpvopZ81hR0xEerPFtHfm9uL02/ZYoMxH9pIWazM2yGBaQM/1/yolov8.zip?X-Goog-Algorithm=G00G4-RSA-SHA256&X-Goog-Credential=481589474394-compute%40developer.gserviceaccount.com%2F20230907%2Fauto%2Fstorage%2Fgoog4_request&X-Goog-Date=20230907T040622Z&X-Goog-Expires=900&X-Goog-SignedHeaders=host&X-Goog-Signature=034dbcb63679dd175feb5d366004a0a7b595940ae9a68e8b18fb71cfe014046296165da63896fe12b554430a8dda6fb5792ca3188b25cf9d5da3f3562b314c53600d8b68be0ec784b631261c962129ecdc0d90ae30cf73fa906372fa71963f8b8f9280d2020686fc7cd71e2386d121f6721eccc138fc0366313e9785e45b08746daad24352869cd43fc44dd26264d31688d5be8369be1e787c33fc33a0e6c6f75cfd233af7f8db6c4264e8e076c813c06bf63d59bdd040e116fc90ca213f9c2bcd0077e391741bb1ededf1f19baefd018cf6a64f0ac5c9c66c03418d943edf02e99829c3b42001db87ce723a685f925b835f76f2b729988f0a804046c663c7
Resolving storage.googleapis.com (storage.googleapis.com)... 34.64.4.91, 34.64.4.123, 34.64.4.27, ...
Connecting to storage.googleapis.com (storage.googleapis.com)|34.64.4.91|:443... connected.
HTTP request sent, awaiting response... 200 OK
Length: 330248370 (315M) [application/zip]
Saving to: 'FIRESMOKE.zip'

FIRESMOKE.zip      53%[=====>] 168.78M  24.8MB/s   eta 7s

saving to: FIRESMOKE.zip

FIRESMOKE.zip      100%[=====] 314.95M  24.0MB/s   in 14s

2023-09-07 02:57:01 (22.9 MB/s) - 'FIRESMOKE.zip' saved [330248370/330248370]
```

5)

```
import zipfile

with zipfile.ZipFile('FIRESMOKE.zip') as target_file:
    target_file.extractall('FIRESMOKE/')
```

6) !cat FIRESMOKE/data.yaml

```
In [7]: !cat FIRESMOKE/data.yaml
```

```
train: ../train/images
val: ../valid/images
test: ../test/images

nc: 4
names: ['0', '1', 'Smoke', 'smoke']

roboflow:
  workspace: wojtek-bednorz-oertn
  project: fire-smoke-xfvrl
  version: 1
  license: CC BY 4.0
  url: https://universe.roboflow.com/wojtek-bednorz-oertn/fire-smoke-xfvrl/dataset/1
```

7) !pip install PyYAML

```
In [8]: !pip install PyYAML
```

```
Defaulting to user installation because normal site-packages is not writeable
Requirement already satisfied: PyYAML in ./local/lib/python3.9/site-packages (6.0.1)
```

8)

```
import yaml

data = { 'train' : '/home/j-j9a101/FIRESMOKE/train/images/',
        'val' : '/home/j-j9a101/FIRESMOKE/valid/images/',
        'test' : '/home/j-j9a101/FIRESMOKE/test/images/',
        'names' : ['0', '1', 'Smoke', 'smoke'],
        'nc' : 4 }

with open('FIRESMOKE/FIRESMOKE.yaml', 'w') as f:
    yaml.dump(data, f)

with open('FIRESMOKE/FIRESMOKE.yaml', 'r') as f:
    firesmoke_yaml = yaml.safe_load(f)
    display(firesmoke_yaml)
```

```
{'names': ['0', '1', 'Smoke', 'smoke'],
 'nc': 4,
 'test': '/home/j-j9a101/FIRESMOKE/test/images/',
 'train': '/home/j-j9a101/FIRESMOKE/train/images/',
 'val': '/home/j-j9a101/FIRESMOKE/valid/images/'}
```

9)

```
!pip install ultralytics
```

10)

```
import ultralytics

ultralytics.checks()
```

```
Ultralytics YOLOv8.0.172 🚀 Python-3.9.7 torch-2.0.1+cu117 CUDA:0 (Tesla V100-PCIE-32GB, 32511MiB)
Setup complete ✅ (80 CPUs, 1259.9 GB RAM, 155.0/1258.2 GB disk)
```

11)

```
from ultralytics import YOLO

model = YOLO('yolov8x.pt')
```

12)

```
print(type(model.names), len(model.names))

print(model.names)
```

```
<class 'dict'> 80
{0: 'person', 1: 'bicycle', 2: 'car', 3: 'motorcycle', 4: 'airplane', 5: 'bus', 6: 'train', 7: 'truck', 8: 'boat', 9: 'traffic light',
10: 'fire hydrant', 11: 'stop sign', 12: 'parking meter', 13: 'bench', 14: 'bird', 15: 'cat', 16: 'dog', 17: 'horse', 18: 'sheep', 19:
'cow', 20: 'elephant', 21: 'bear', 22: 'zebra', 23: 'giraffe', 24: 'backpack', 25: 'umbrella', 26: 'handbag', 27: 'tie', 28: 'suitcase',
29: 'frisbee', 30: 'skis', 31: 'snowboard', 32: 'sports ball', 33: 'kite', 34: 'baseball bat', 35: 'baseball glove', 36: 'skateboard',
37: 'surfboard', 38: 'tennis racket', 39: 'bottle', 40: 'wine glass', 41: 'cup', 42: 'fork', 43: 'knife', 44: 'spoon', 45: 'bowl',
46: 'banana', 47: 'apple', 48: 'sandwich', 49: 'orange', 50: 'broccoli', 51: 'carrot', 52: 'hot dog', 53: 'pizza', 54: 'donut', 55: 'cake',
56: 'chair', 57: 'couch', 58: 'potted plant', 59: 'bed', 60: 'dining table', 61: 'toilet', 62: 'tv', 63: 'laptop', 64: 'mouse', 65: 'remote',
66: 'keyboard', 67: 'cell phone', 68: 'microwave', 69: 'oven', 70: 'toaster', 71: 'sink', 72: 'refrigerator', 73: 'book',
74: 'clock', 75: 'vase', 76: 'scissors', 77: 'teddy bear', 78: 'hair drier', 79: 'toothbrush'}
```

13)

```
import torch, gc

gc.collect()
torch.cuda.empty_cache()

model.train(data='FIRESMOKE/FIRESMOKE.yaml', epochs=300, batch=64)
```

```

gc.collect()
torch.cuda.empty_cache()

model.train(data='FIRESMOKE/FIRESMOKE.yaml', epochs=300, batch=64)
image_sizes 640 train, 640 val
Using 8 dataloader workers
Logging results to runs/detect/train4
Starting training for 300 epochs...

   Epoch    GPU_mem  box_loss  cls_loss  dfl_loss  Instances    Size
  0%|          | 0/107 [00:00<?, ?it/s]

-----
OutOfMemoryError                                Traceback (most recent call last)
Input In [18], in <cell line: 6>()
      3 gc.collect()
      4 torch.cuda.empty_cache()
--> 6 model.train(data='FIRESMOKE/FIRESMOKE.yaml', epochs=300, batch=64)

File ~/local/lib/python3.9/site-packages/ultralytics/engine/model.py:341, in Model.train(self, trainer, **kwargs)
    339     self.model = self.trainer.model
    340 self.trainer.hub_session = self.session # attach optional HUB session
--> 341 self.trainer.train()
    342 # Update model and cfg after training

```

메모리 터졌다. batch 를 32로 바꿔주기. 그래도 터진다..

14)

```

metrics = model.val()
print(metrics)

```