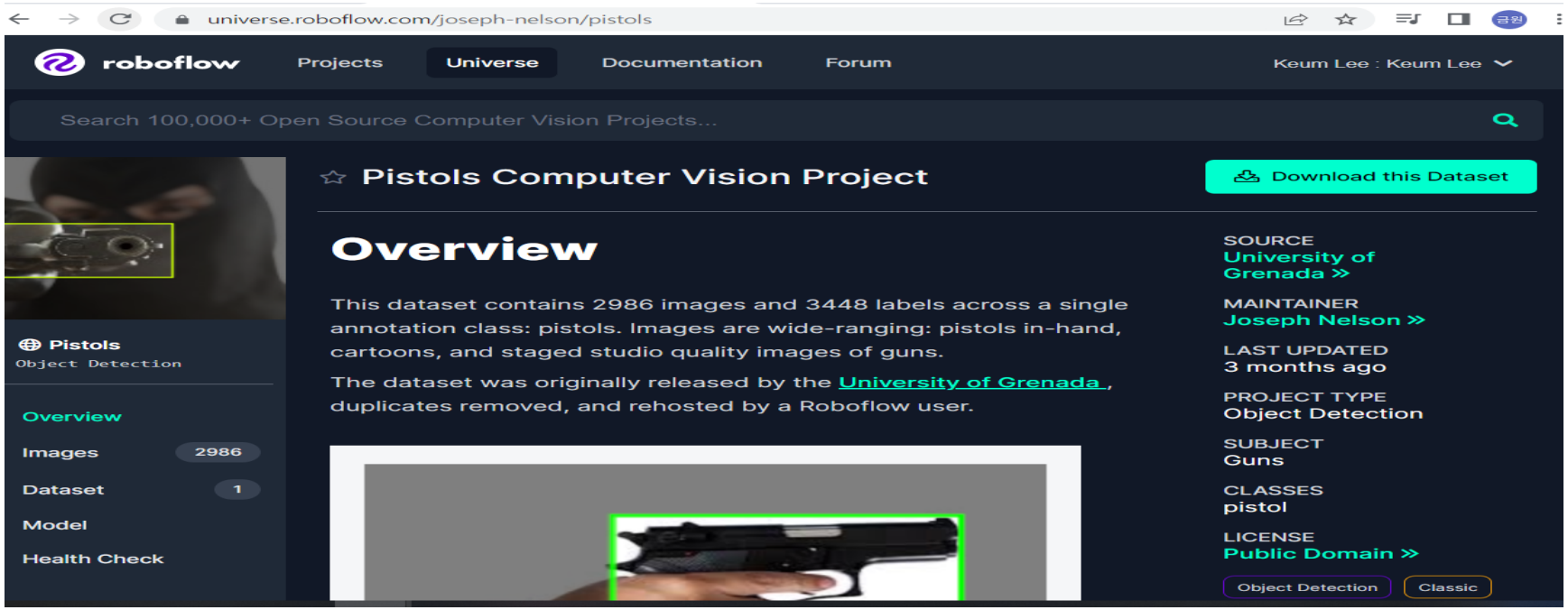
Yolo5 학습 및 탐색

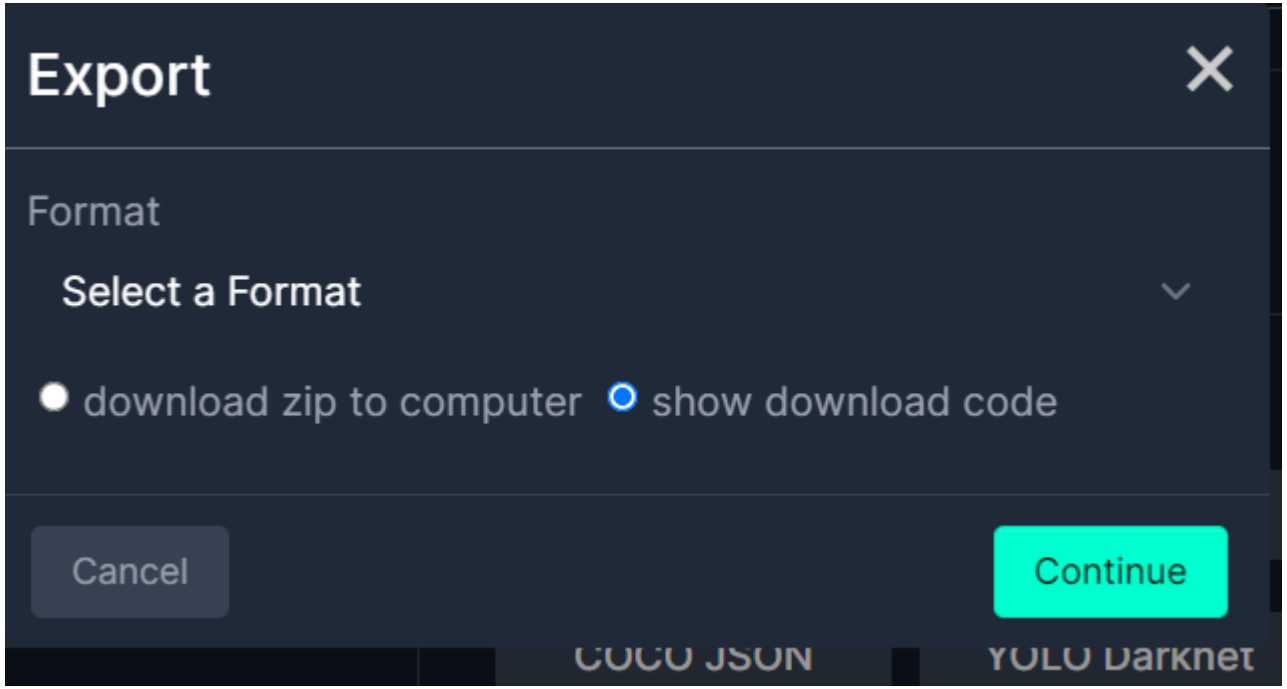
<dataset 확보>

참고: https://minding-deep-learning.tistory.com/19

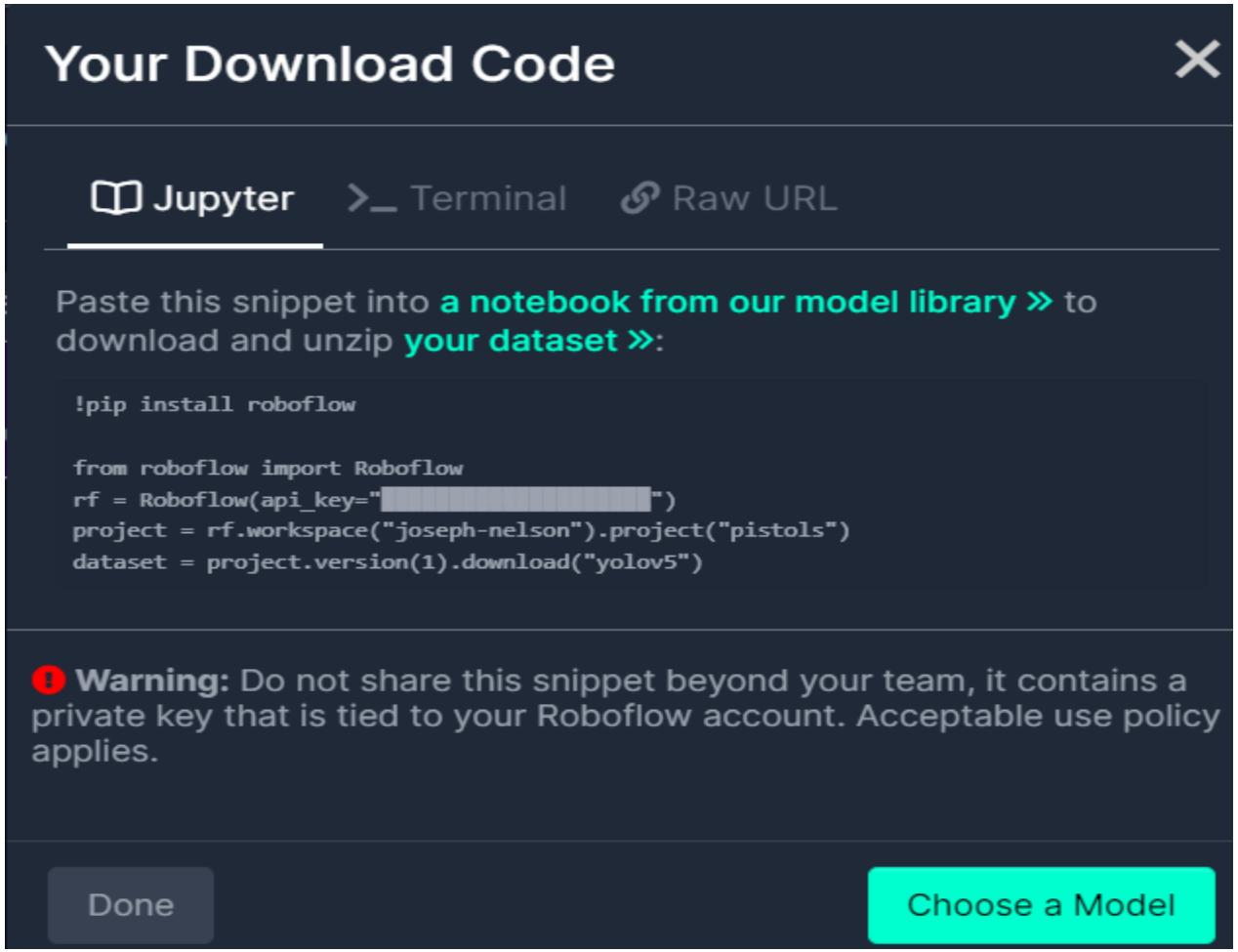
. Dataset 구하기 ('https://universe.roboflow.com/'에서 https://universe.roboflow.com/joseph-nelson/pistols (피스톨 데이터셋) 선택)



. Download this dataset 클릭 => 'Yolov5 Pytorch'를 Format 으로 선택하고 'show downlad code' 선택하고 'Continue'

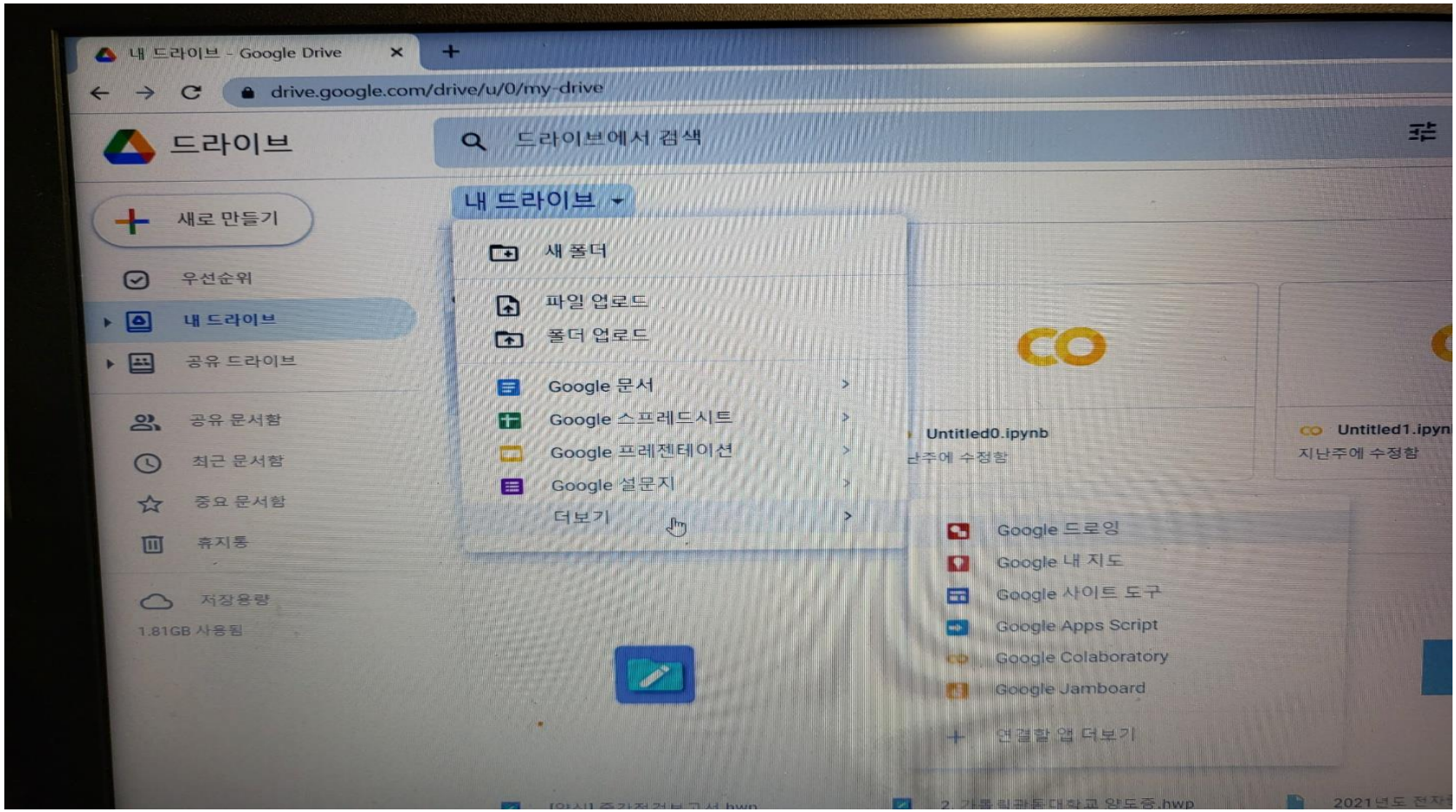



```
!pip install roboflow

from roboflow import Roboflow
rf = Roboflow(api_key="1I28shYwWWZasx0TI9sX")
project = rf.workspace("joseph-nelson").project("pistols")
dataset = project.version(1).download("yolov5")
```

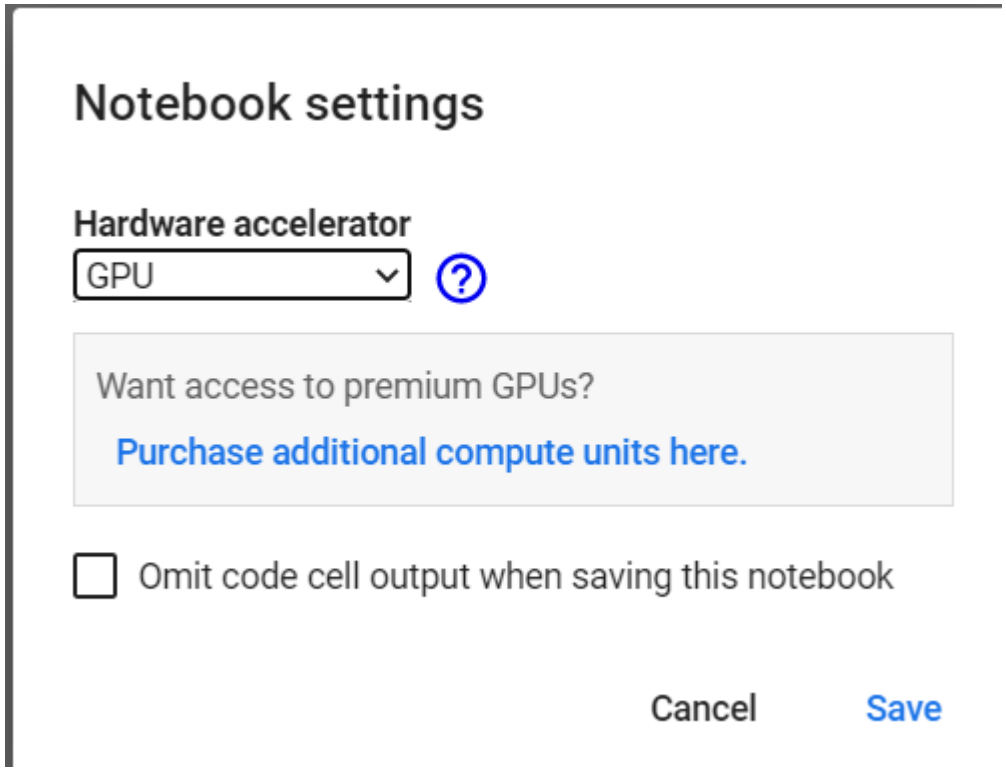


<구글 Colab (Colaboratory, 클라우드서버) 들어가기>

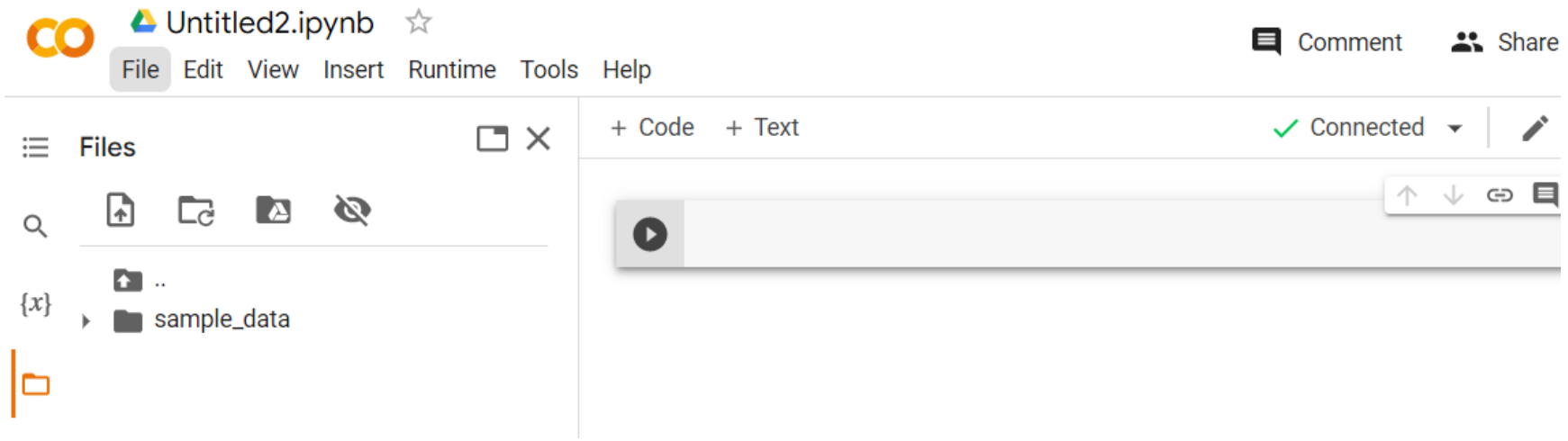
. 구글 My drive / 더 보기 / Google colaboratory 선택



. 상단 메뉴에서 ‘runtime’ /’change runtime type’을 다음과 같이 선택한 후 ‘Save’



. 좌측 노란 폴더를 클릭하면 dir 구조(Sample_data) 나옴

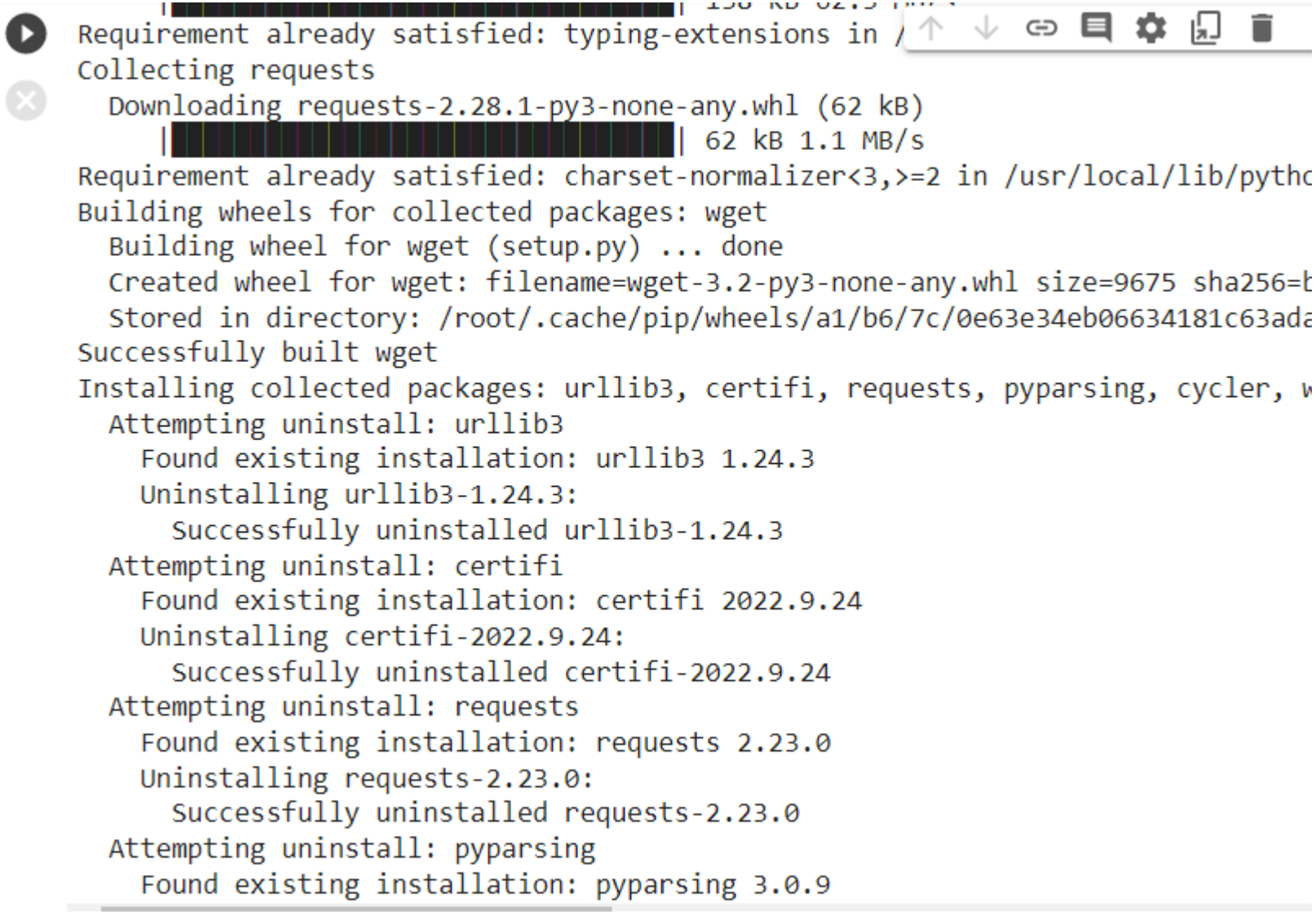


. Roboflow 에서 복사한 코드를 붙여 넣기(^V)후 실행(우측 삼각형 클릭)

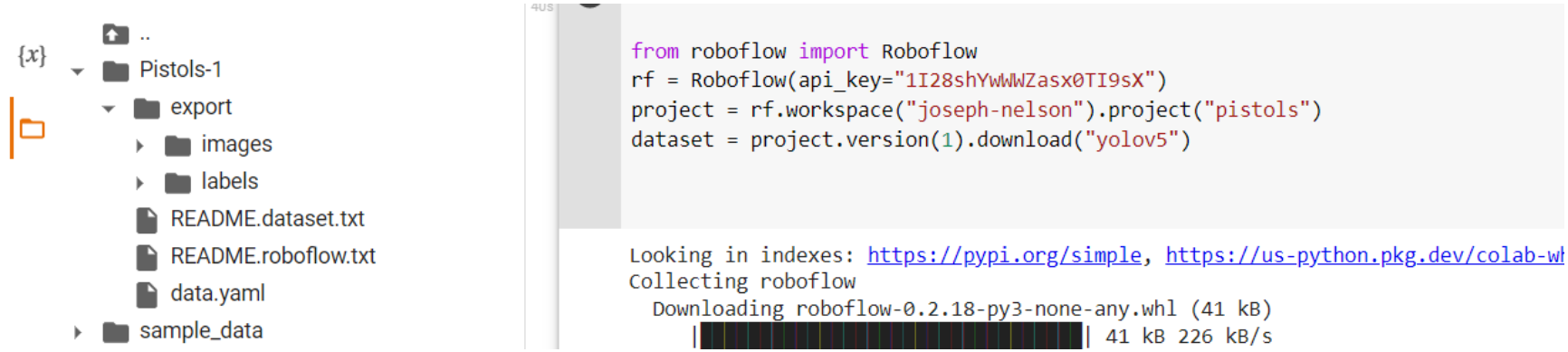
```
!pip install roboflow

from roboflow import Roboflow
rf = Roboflow(api_key="1I28shYwWWZasx0TI9sX")
project = rf.workspace("joseph-nelson").project("pistols")
dataset = project.version(1).download("yolov5")
```

```
Looking in indexes: https://pypi.org/simple, https://us-python.pkg.dev/colab-wh
Collecting roboflow
  Downloading roboflow-0.2.18-py3-none-any.whl (41 kB)
     |████████████████████████████████| 41 kB 226 kB/s
Requirement already satisfied: tqdm>=4.41.0 in /usr/local/lib/python3.7/dist-pa
Requirement already satisfied: PyYAML>=5.3.1 in /usr/local/lib/python3.7/dist-p
Collecting cycler==0.10.0
  Downloading cycler-0.10.0-py2.py3-none-any.whl (6.5 kB)
Requirement already satisfied: opencv-python-headless>=4.5.1.48 in /usr/local/l
Requirement already satisfied: matplotlib in /usr/local/lib/python3.7/dist-pack
Collecting certifi==2021.5.30
  Downloading certifi-2021.5.30-py2.py3-none-any.whl (145 kB)
     |████████████████████████████████| 145 kB 27.0 MB/s
Requirement already satisfied: Pillow>=7.1.2 in /usr/local/lib/python3.7/dist-p
Collecting python-dotenv
  Downloading python_dotenv-0.21.0-py3-none-any.whl (18 kB)
Requirement already satisfied: python-dateutil in /usr/local/lib/python3.7/dist
Collecting chardet==4.0.0
```

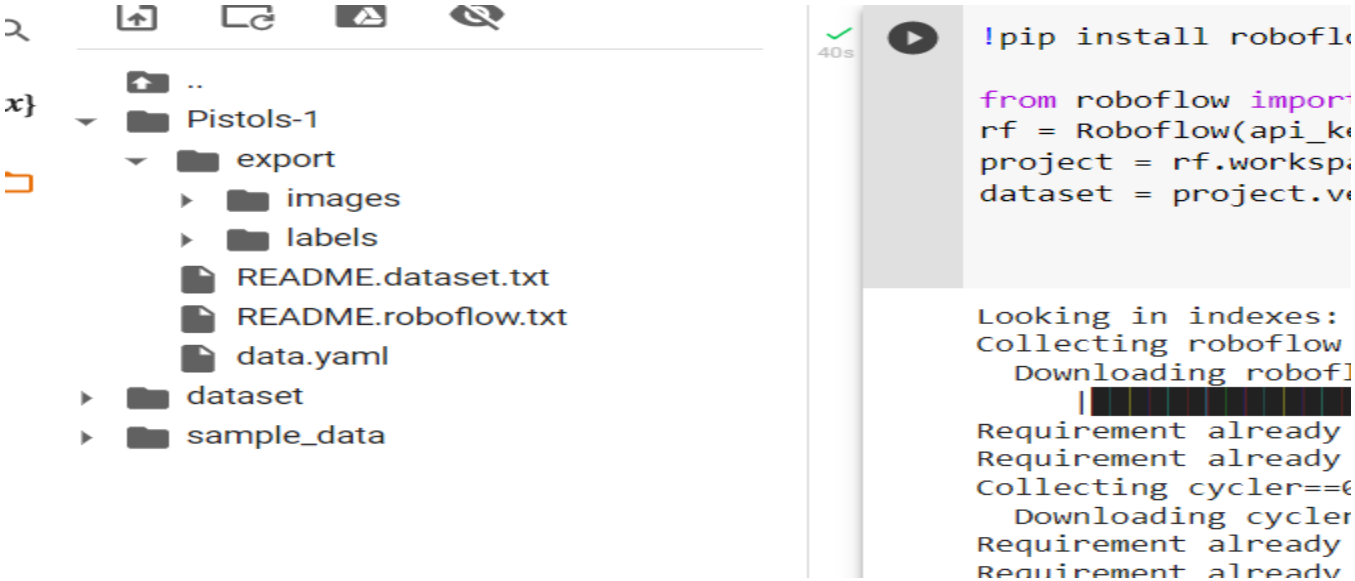
(중간 생략)

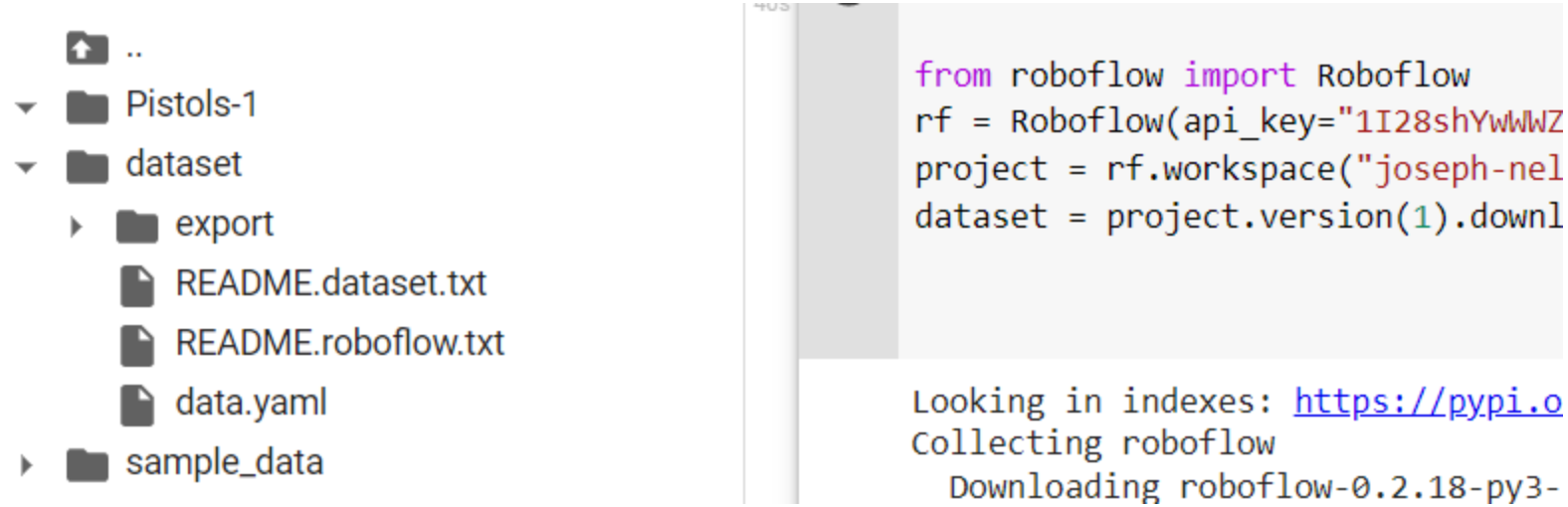


```
Requirement already satisfied: typing-extensions in /
Collecting requests
  Downloading requests-2.28.1-py3-none-any.whl (62 kB)
     |████████████████████████████████| 62 kB 1.1 MB/s
Requirement already satisfied: charset-normalizer<3,>=2 in /usr/local/lib/pythc
Building wheels for collected packages: wget
  Building wheel for wget (setup.py) ... done
  Created wheel for wget: filename=wget-3.2-py3-none-any.whl size=9675 sha256=b
  Stored in directory: /root/.cache/pip/wheels/a1/b6/7c/0e63e34eb06634181c63ada
Successfully built wget
Installing collected packages: urllib3, certifi, requests, pyparsing, cycler, w
  Attempting uninstall: urllib3
    Found existing installation: urllib3 1.24.3
    Uninstalling urllib3-1.24.3:
      Successfully uninstalled urllib3-1.24.3
  Attempting uninstall: certifi
    Found existing installation: certifi 2022.9.24
    Uninstalling certifi-2022.9.24:
      Successfully uninstalled certifi-2022.9.24
  Attempting uninstall: requests
    Found existing installation: requests 2.23.0
    Uninstalling requests-2.23.0:
      Successfully uninstalled requests-2.23.0
  Attempting uninstall: pyparsing
    Found existing installation: pyparsing 3.0.9
```



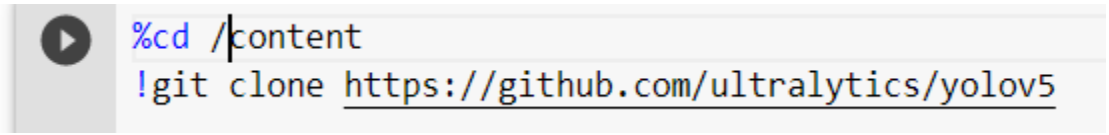
. 마우스 우측 버튼을 눌러서 새로 'dataset' 폴더를 만들고 dataset 폴더에 Pistols-1 아래 모든 폴더를 옮김



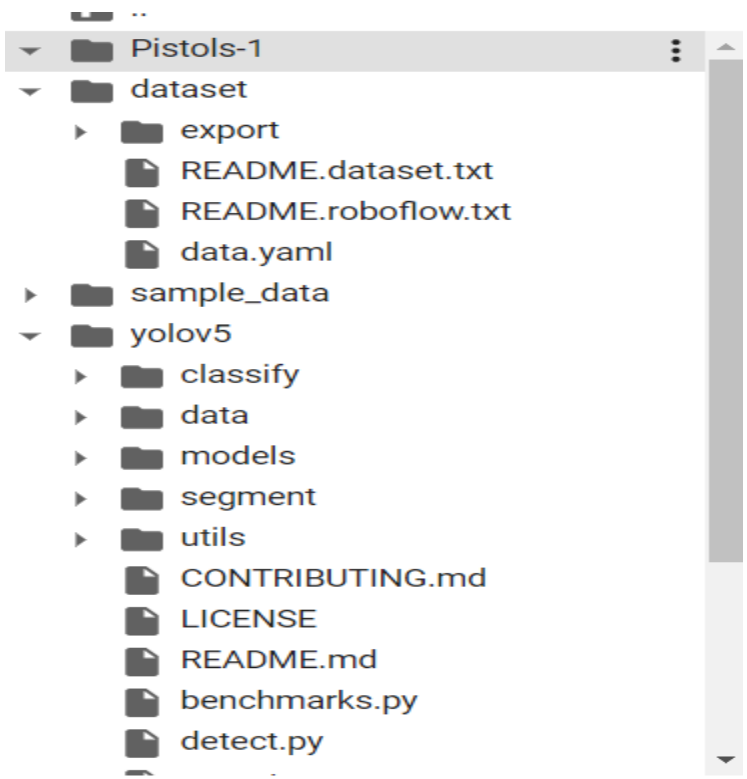


. Yolov5 다운(현재 보이는 Content 폴더에)

```
%cd /content
!git clone https://github.com/ultralytics/yolov5
```



```
Cloning into 'yolov5'...
remote: Enumerating objects: 14841, done.
remote: Counting objects: 100% (172/172), done.
remote: Compressing objects: 100% (96/96), done.
remote: Total 14841 (delta 100), reused 131 (delta 75), pack-reused 14669
Receiving objects: 100% (14841/14841), 13.60 MiB | 22.65 MiB/s, done.
Resolving deltas: 100% (10239/10239), done.
```



. 필요한 패키지 설치

```
%cd  /content/yolov5/
!pip install -r requirements.txt
```

(중간생략)

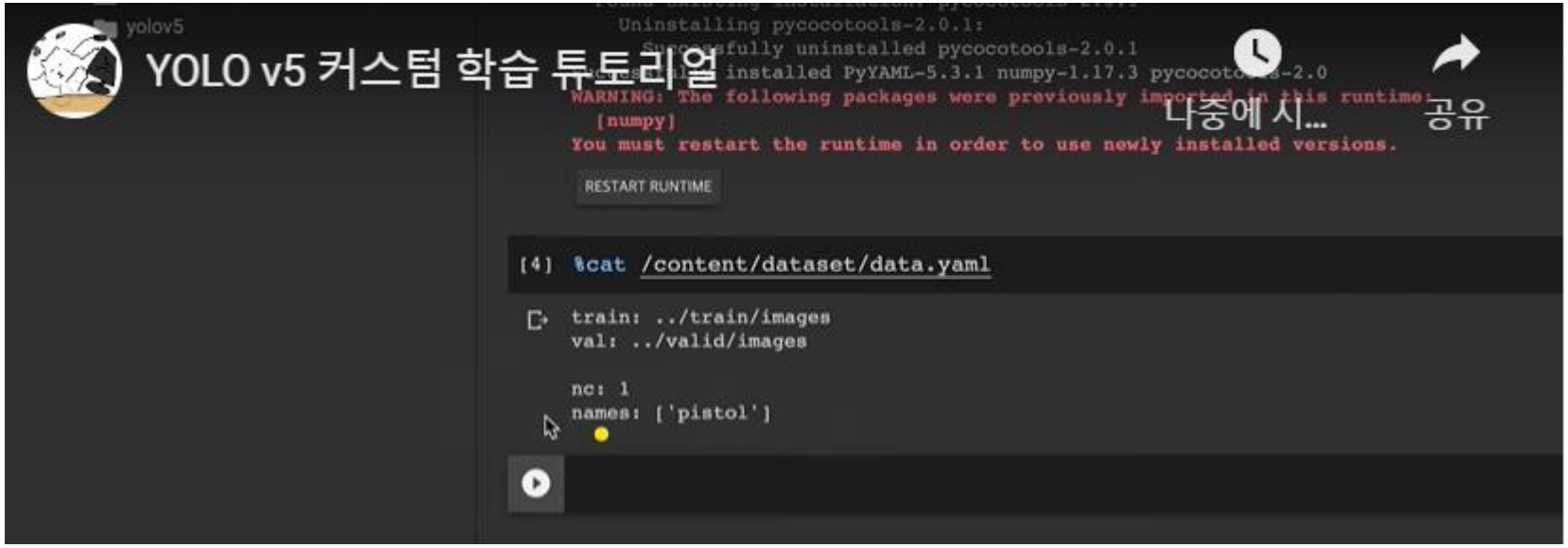
```
Requirement already satisfied: zipp>=0.5 in /usr/local/lib/python3.7/dist-packa
Requirement already satisfied: pyasn1<0.5.0,>=0.4.6 in /usr/local/lib/python3.7
Requirement already satisfied: oauthlib>=3.0.0 in /usr/local/lib/python3.7/dist
Requirement already satisfied: backcall in /usr/local/lib/python3.7/dist-packag
Requirement already satisfied: pickleshare in /usr/local/lib/python3.7/dist-pac
Collecting jedi>=0.10
  Downloading jedi-0.18.1-py2.py3-none-any.whl (1.6 MB)
     |████████████████████████████████| 1.6 MB 13.9 MB/s
Requirement already satisfied: decorator in /usr/local/lib/python3.7/dist-packa
Requirement already satisfied: prompt-toolkit<2.1.0,>=2.0.0 in /usr/local/lib/p
Requirement already satisfied: pygments in /usr/local/lib/python3.7/dist-packag
Requirement already satisfied: pexpect in /usr/local/lib/python3.7/dist-package
Requirement already satisfied: traitlets>=4.2 in /usr/local/lib/python3.7/dist-
Requirement already satisfied: parso<0.9.0,>=0.8.0 in /usr/local/lib/python3.7/
Requirement already satisfied: wcwidth in /usr/local/lib/python3.7/dist-package
Requirement already satisfied: ptyprocess>=0.5 in /usr/local/lib/python3.7/dist
Installing collected packages: jedi, thop
Successfully installed jedi-0.18.1 thop-0.1.1.post2209072238
```

. dataset/data.yaml 수정

```
%cat /content/dataset/data.yaml
```

```
%cat /content/dataset/data.yaml
```

```
names:
- pistol
nc: 1
train: Pistols-1/train/images
val: Pistols-1/valid/images
```



. dir 를 root 로 바꾸고(%cd /), images 들의 경로 변경

```
%cd /
from glob import glob
img_list = glob('/content/dataset/export/images/*.jpg')
print(len(img_list))
```

```
%cd /
from glob import glob
img_list = glob('/content/dataset/export/images/*.jpg')
print(len(img_list))
```

```
/
2971
```

. Image 나누기

```
from sklearn.model_selection import train_test_split
train_img_list, val_img_list = train_test_split(img_list, test_size=0.2, rand
om_state=2000)
print(len(train_img_list),len(val_img_list))
```

```
[13] from sklearn.model_selection import train_test_split
     train_img_list, val_img_list = train_test_split(img_list, test_size=0.2, random_state=2000)
     print(len(train_img_list),len(val_img_list))
```

```
2376 595
```

. Image 경로 txt 파일 만들기

```
with open('/content/dataset/train.txt', 'w') as f:
  f.write('\n'.join(train_img_list) + '\n')

with open('/content/dataset/val.txt', 'w') as f:
  f.write('\n'.join(val_img_list) + '\n')
```

```
[16] with open('/content/dataset/train.txt', 'w') as f:
       f.write('\n'.join(train_img_list) + '\n')
```

```
[17] with open('/content/dataset/val.txt', 'w') as f:
       f.write('\n'.join(val_img_list) + '\n')
```

. yaml 파일 읽기

```
import yaml
with open('/content/dataset/data.yaml','r') as f:
  data = yaml.full_load(f)
print(data)
```

```
[20] import yaml
     with open('/content/dataset/data.yaml','r') as f:
       data = yaml.full_load(f)
     print(data)
```

```
{'names': ['pistol'], 'nc': 1, 'train': 'Pistols-1/train/images', 'val': 'Pistols-1/valid/images'}
```

. yaml 파일 이미지 경로 변경

```
data['train']='/content/dataset/train.txt'
data['val']='/content/dataset/val.txt'
with open('/content/dataset/data.yaml','w') as f:
  yaml.dump(data,f)
```

```
[21] data['train']='/content/dataset/train.txt'
     data['val']='/content/dataset/val.txt'
     with open('/content/dataset/data.yaml','w') as f:
       yaml.dump(data,f)
```

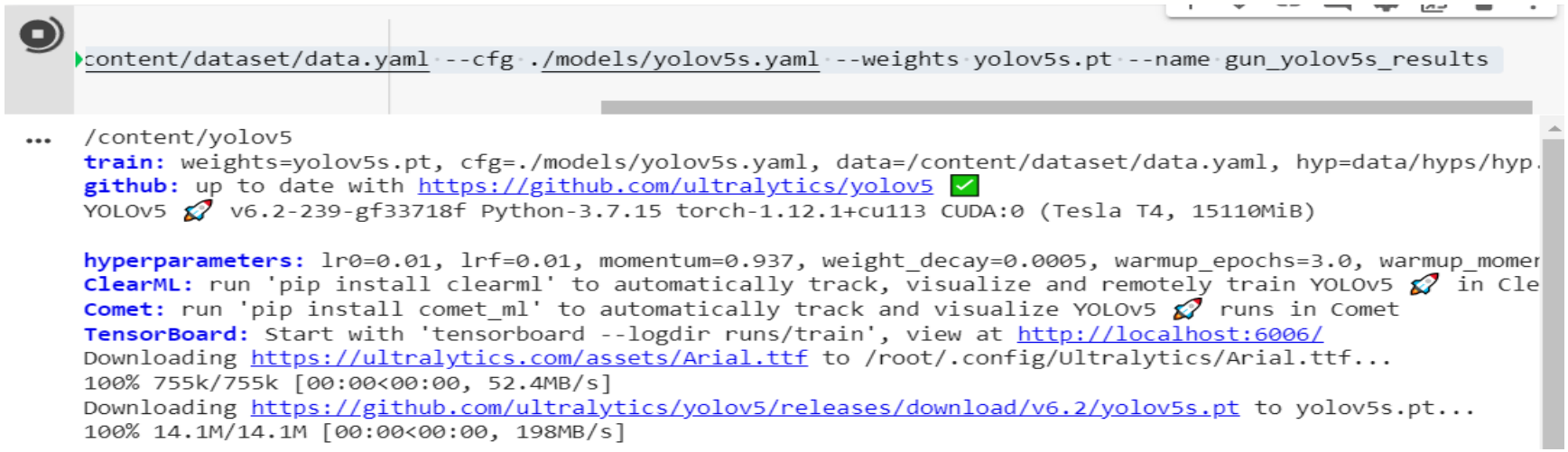
. yaml 파일 변경 확인

```
print(data)
```

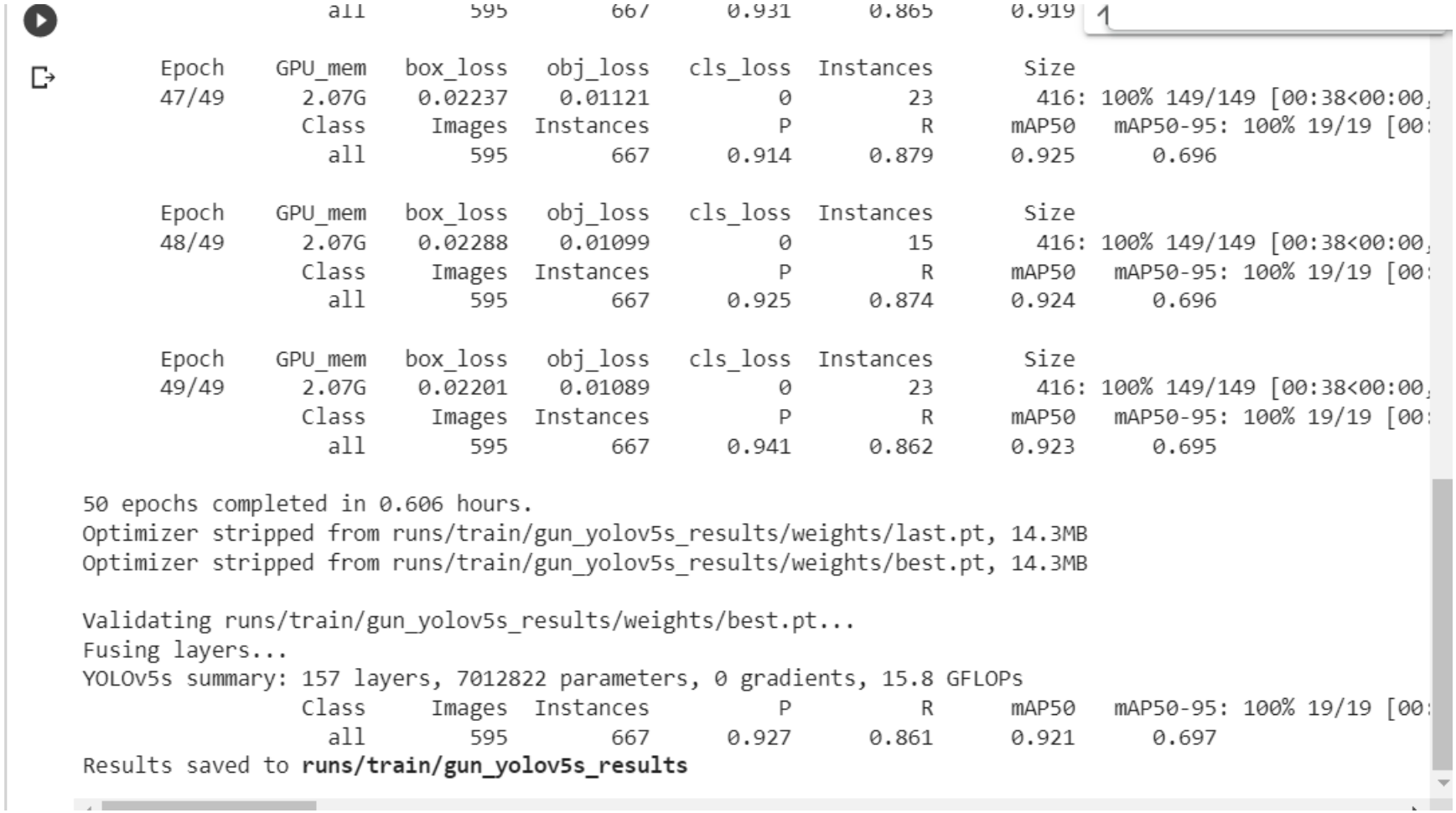
```
[22] print(data)

     {'names': ['pistol'], 'nc': 1, 'train': '/content/dataset/train.txt', 'val': '/content/dataset/val.txt'}
```

. Custom dataset 학습(training)

```
%cd /content/yolov5/
!python train.py --img 416 --batch 16 --epochs 50 --
data /content/dataset/data.yaml --cfg ./models/yolov5s.yaml --
weights yolov5s.pt --name gun_yolov5s_results
```

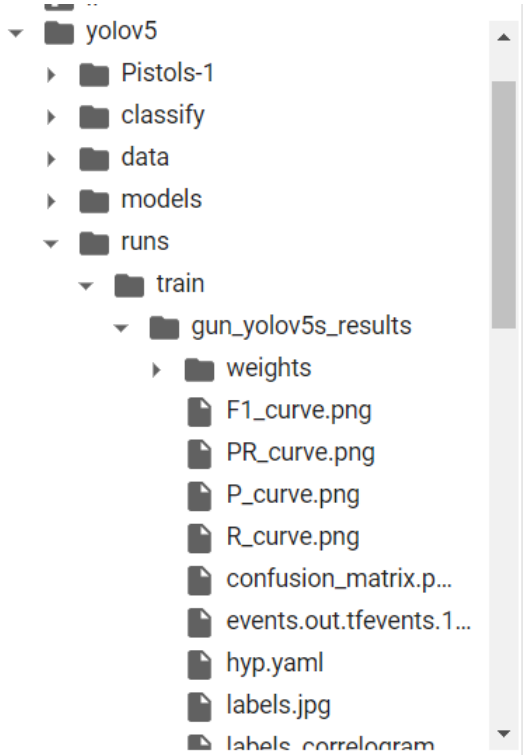


(중간 생략: 총 30 분 소요)



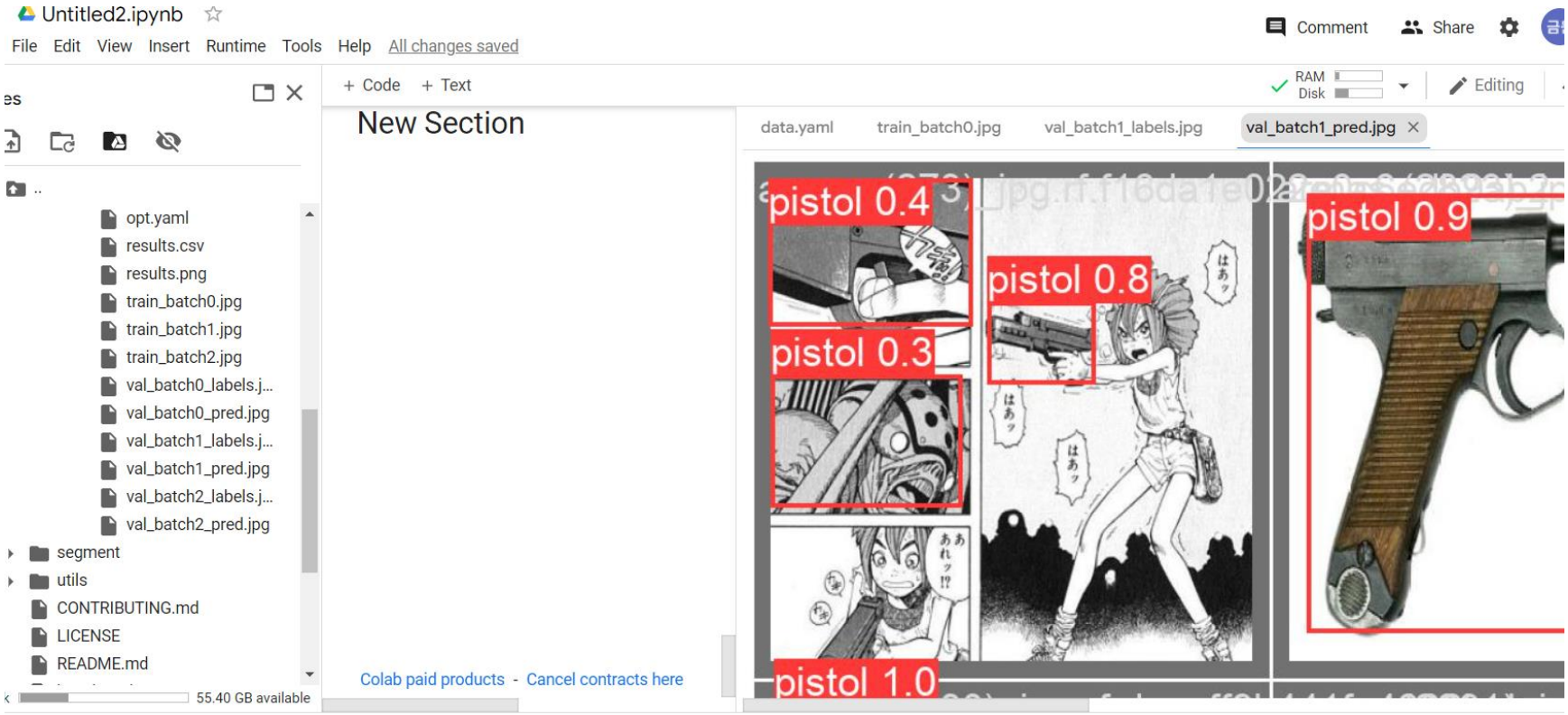
```
                 all        595        667      0.931      0.865      0.919

      Epoch    GPU_mem   box_loss   obj_loss   cls_loss  Instances       Size
      47/49      2.07G    0.02237    0.01121          0         23        416: 100% 149/149 [00:38<00:00,
                 Class     Images  Instances          P          R      mAP50   mAP50-95: 100% 19/19 [00:
                   all        595        667      0.914      0.879      0.925      0.696

      Epoch    GPU_mem   box_loss   obj_loss   cls_loss  Instances       Size
      48/49      2.07G    0.02288    0.01099          0         15        416: 100% 149/149 [00:38<00:00,
                 Class     Images  Instances          P          R      mAP50   mAP50-95: 100% 19/19 [00:
                   all        595        667      0.925      0.874      0.924      0.696

      Epoch    GPU_mem   box_loss   obj_loss   cls_loss  Instances       Size
      49/49      2.07G    0.02201    0.01089          0         23        416: 100% 149/149 [00:38<00:00,
                 Class     Images  Instances          P          R      mAP50   mAP50-95: 100% 19/19 [00:
                   all        595        667      0.941      0.862      0.923      0.695

50 epochs completed in 0.606 hours.
Optimizer stripped from runs/train/gun_yolov5s_results/weights/last.pt, 14.3MB
Optimizer stripped from runs/train/gun_yolov5s_results/weights/best.pt, 14.3MB

Validating runs/train/gun_yolov5s_results/weights/best.pt...
Fusing layers...
YOLOv5s summary: 157 layers, 7012822 parameters, 0 gradients, 15.8 GFLOPs
                 Class     Images  Instances          P          R      mAP50   mAP50-95: 100% 19/19 [00:
                   all        595        667      0.927      0.861      0.921      0.697
Results saved to runs/train/gun_yolov5s_results
```

. 결과 보기 (yolov5/runs/train/gun_yolov5s_results)

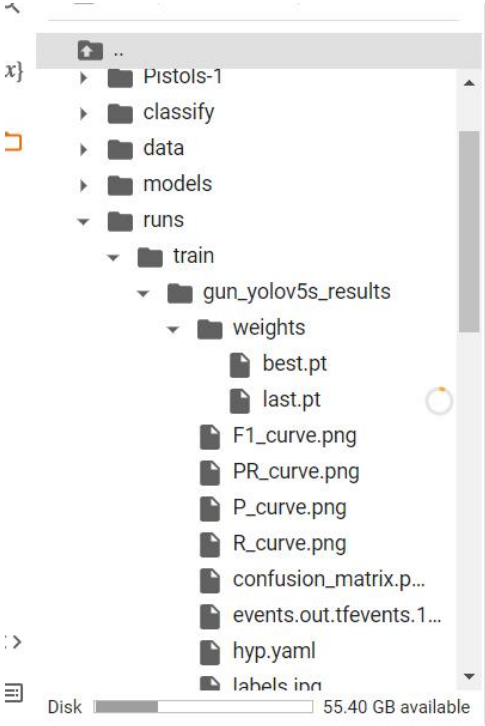



```
      Epoch    GPU_mem   box_loss   obj_loss   cls_loss  Instances       Size
       0/49      1.71G    0.08675    0.02247          0         21        416: 1
                 Class     Images  Instances          P          R      mAP50
                   all        595        667      0.587      0.471      0.508

      Epoch    GPU_mem   box_loss   obj_loss   cls_loss  Instances       Size
       1/49      2.07G    0.05522    0.02007          0         22        416: 1
                 Class     Images  Instances          P          R      mAP50
                   all        595        667      0.505      0.655      0.525

      Epoch    GPU_mem   box_loss   obj_loss   cls_loss  Instances       Size
       2/49      2.07G    0.04889    0.01865          0         22        416: 1
                 Class     Images  Instances          P          R      mAP50
                   all        595        667      0.828      0.694      0.804

      Epoch    GPU_mem   box_loss   obj_loss   cls_loss  Instances       Size
```

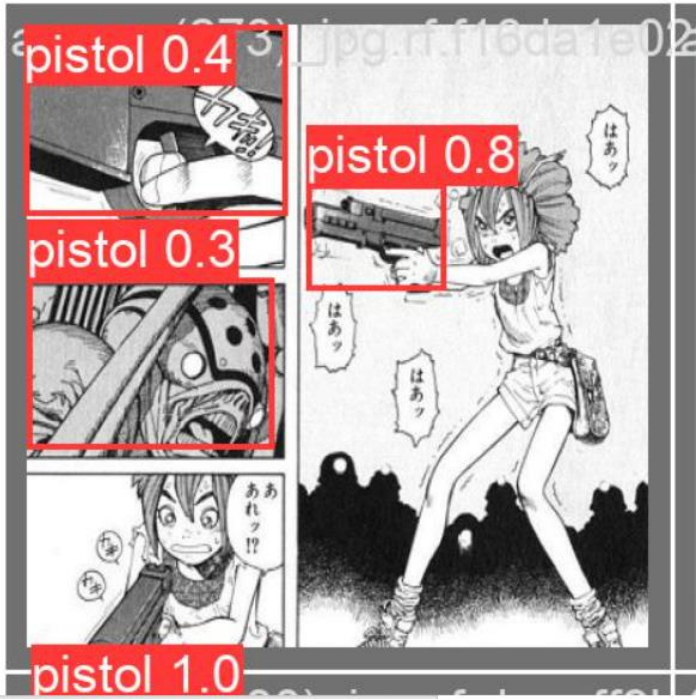
New Section


Untitled2.ipynb
File Edit View Insert Runtime Tools Help All changes saved
Comment
Share
+ Code
+ Text
RAM
Disk
Editing
New Section
data.yaml
train_batch0.jpg
val_batch1_labels.jpg
val_batch1_pred.jpg
opt.yaml
results.csv
results.png
train_batch0.jpg
train_batch1.jpg
train_batch2.jpg
val_batch0_labels.j...
val_batch0_pred.jpg
val_batch1_labels.j...
val_batch1_pred.jpg
val_batch2_labels.j...
val_batch2_pred.jpg
segment
utils
CONTRIBUTING.md
LICENSE
README.md
55.40 GB available
Colab paid products - Cancel contracts here
pistol 0.4
pistol 0.8
pistol 0.3
pistol 0.9
pistol 1.0

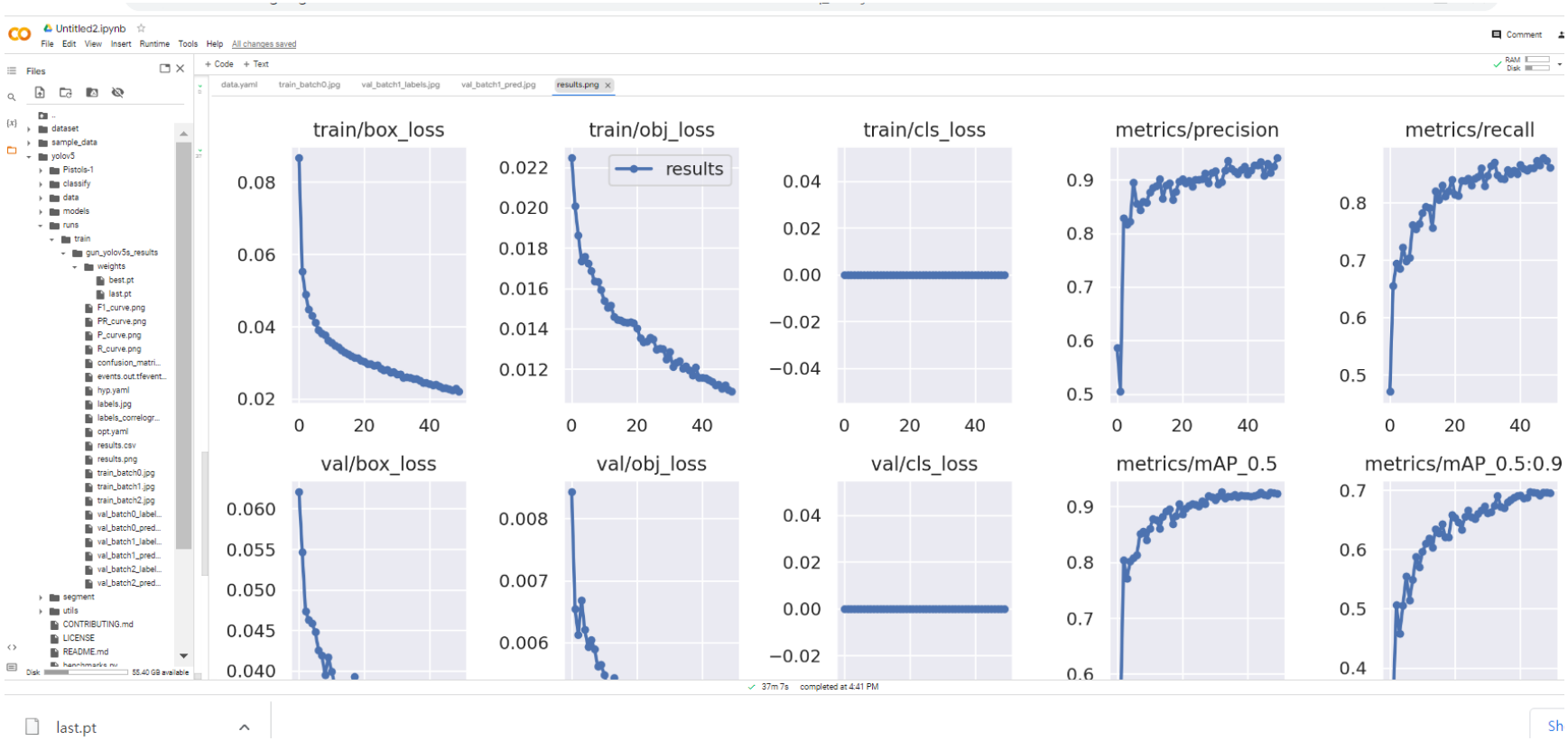
. 최종 가중치



Colab paid products - Cancel contracts here

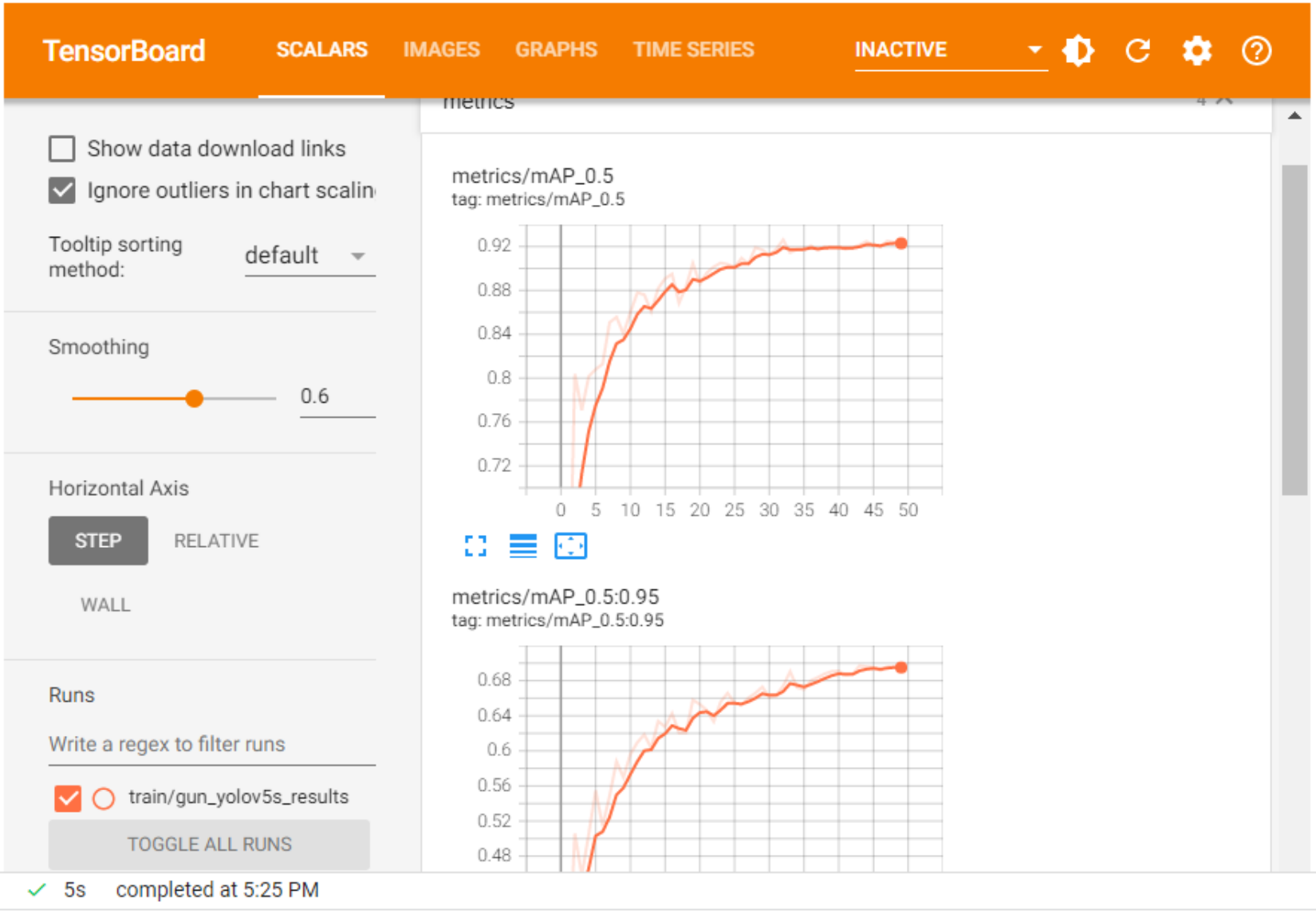


. results (results.png)



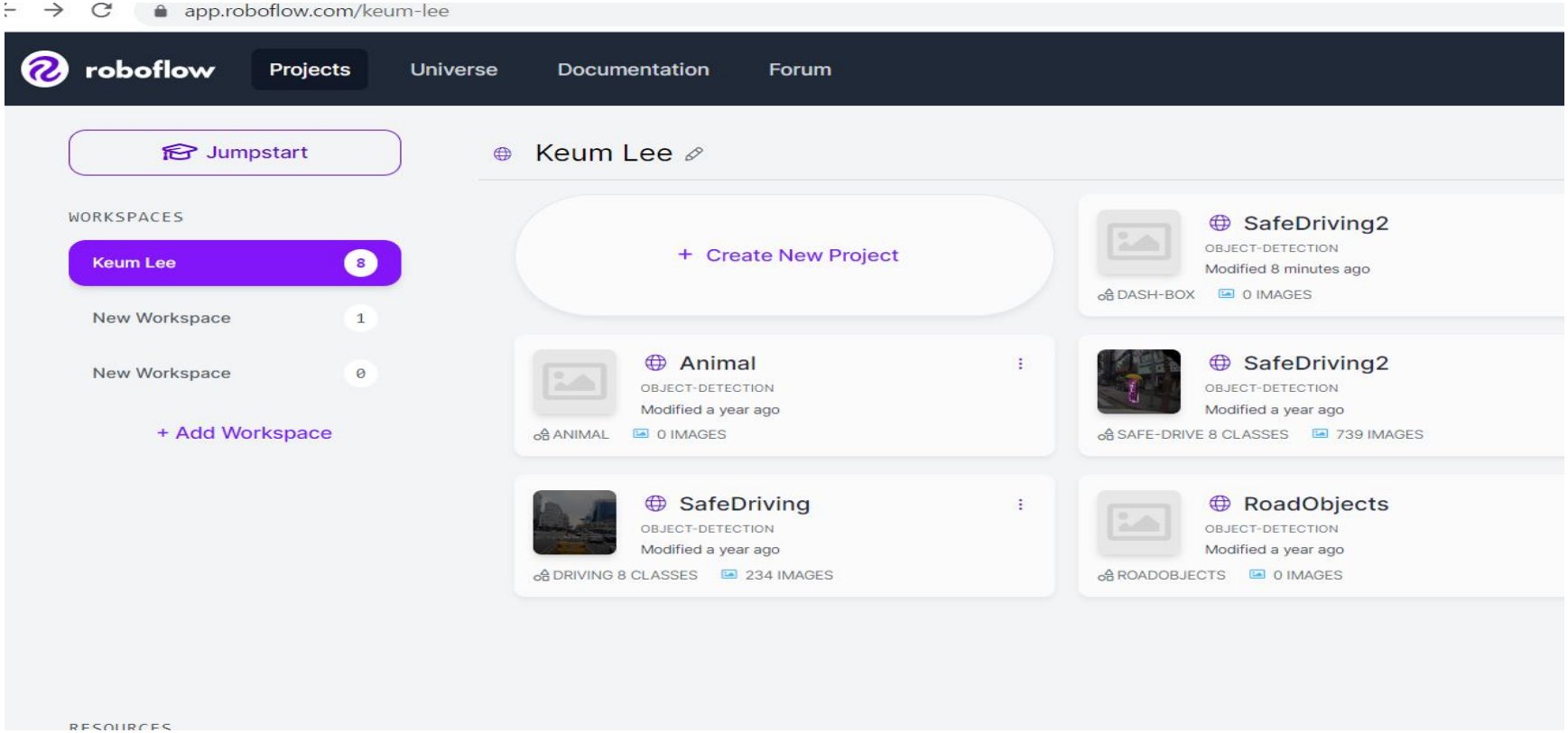
. 학습 결과

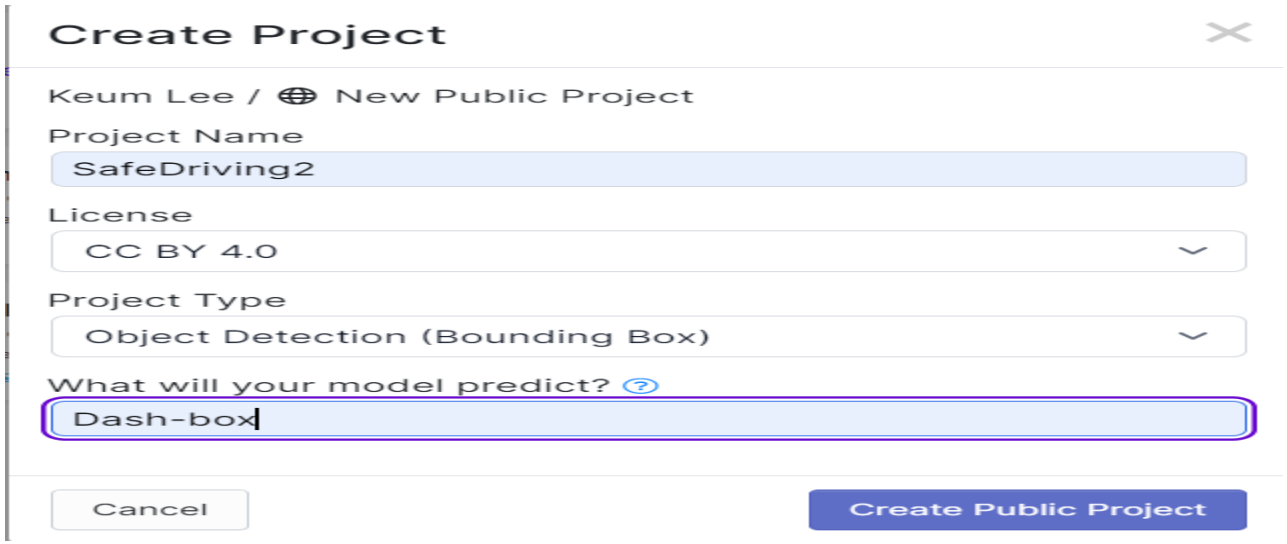
```
%load_ext tensorboard
%tensorboard --logdir /content/yolov5/runs/
```

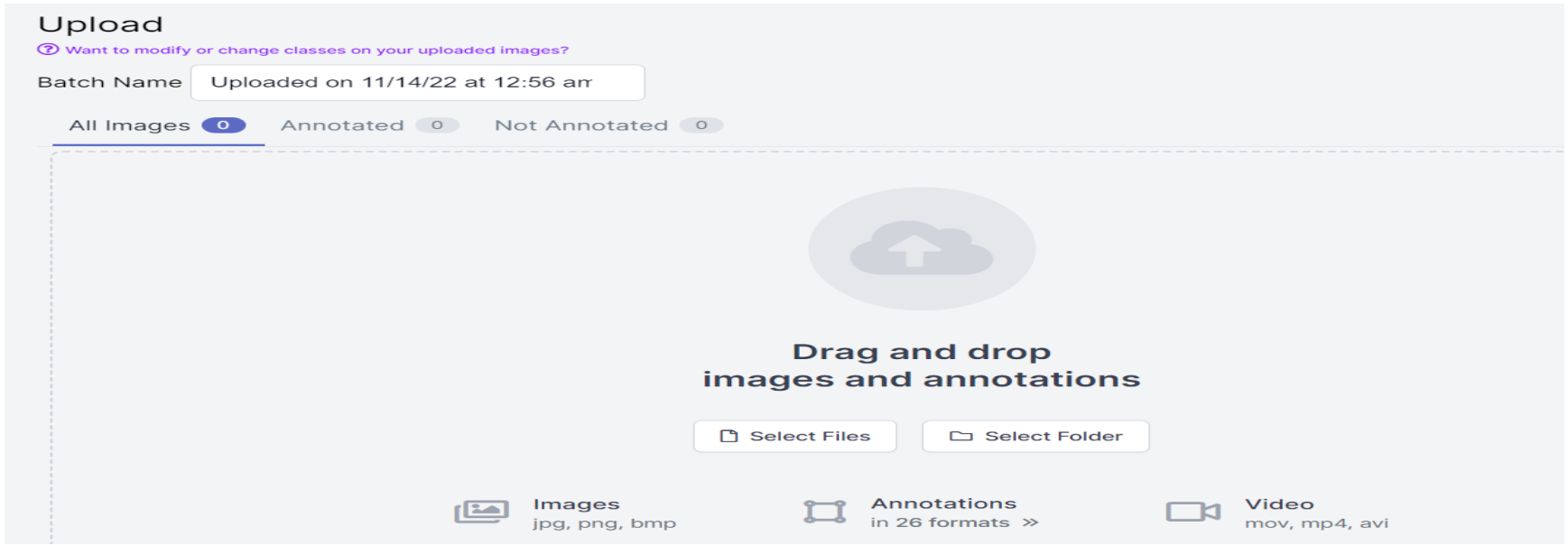

TensorBoard
SCALARS
IMAGES
GRAPHS
TIME SERIES
INACTIVE
Show data download links
Ignore outliers in chart scalin
Tooltip sorting method:
default
Smoothing
0.6
Horizontal Axis
STEP
RELATIVE
WALL
Runs
Write a regex to filter runs
train/gun_yolov5s_results
TOGGLE ALL RUNS
metrics
metrics/mAP_0.5
tag: metrics/mAP_0.5
0.92
0.88
0.84
0.8
0.76
0.72
0 5 10 15 20 25 30 35 40 45 50
metrics/mAP_0.5:0.95
tag: metrics/mAP_0.5:0.95
0.68
0.64
0.6
0.56
0.52
0.48
5s completed at 5:25 PM

. Custom dataset 준비(roboflow (http://www.roboflow.com 에서 계좌를 만듬)활용)

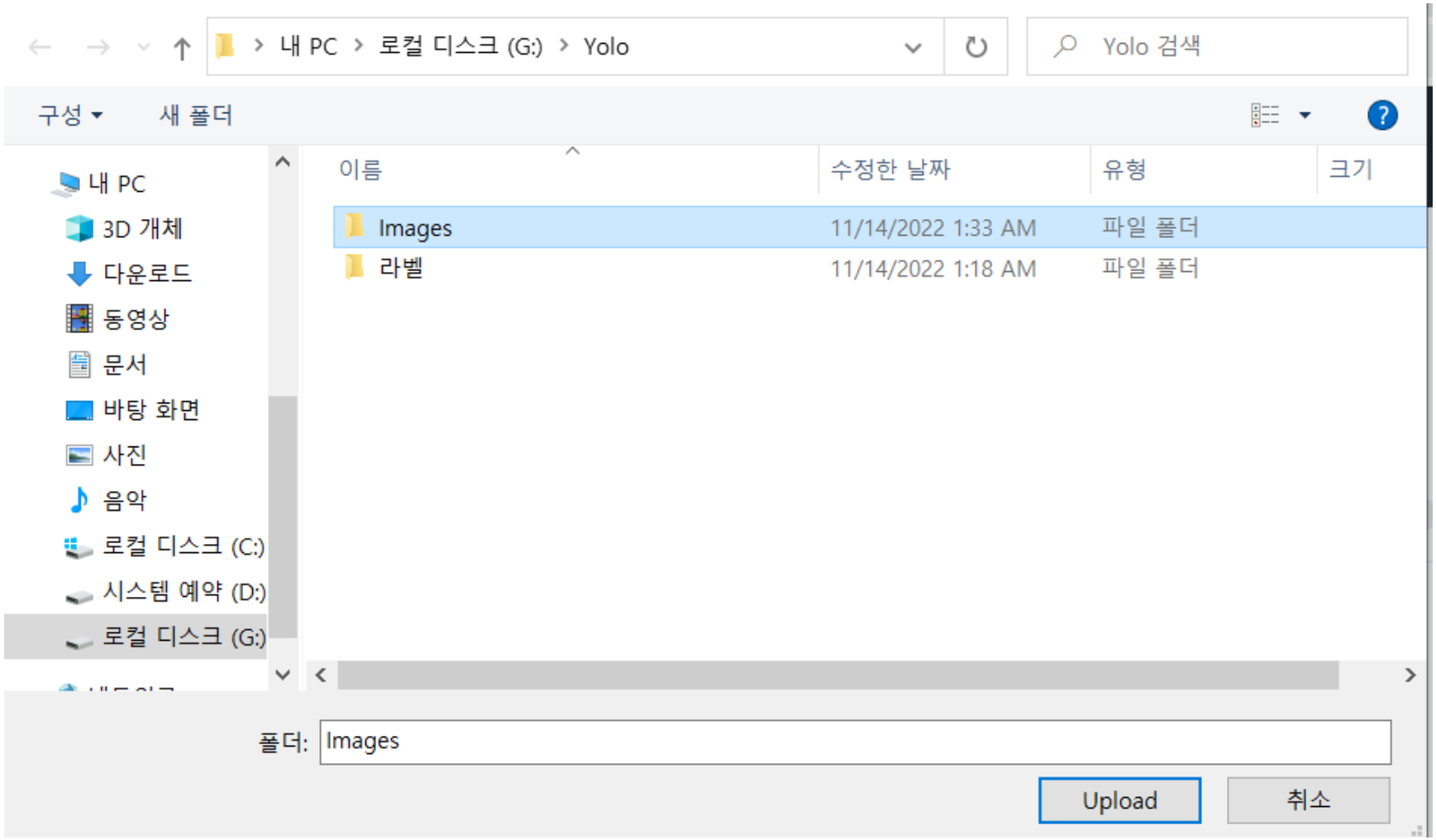
. '+Create New Project'를 클릭



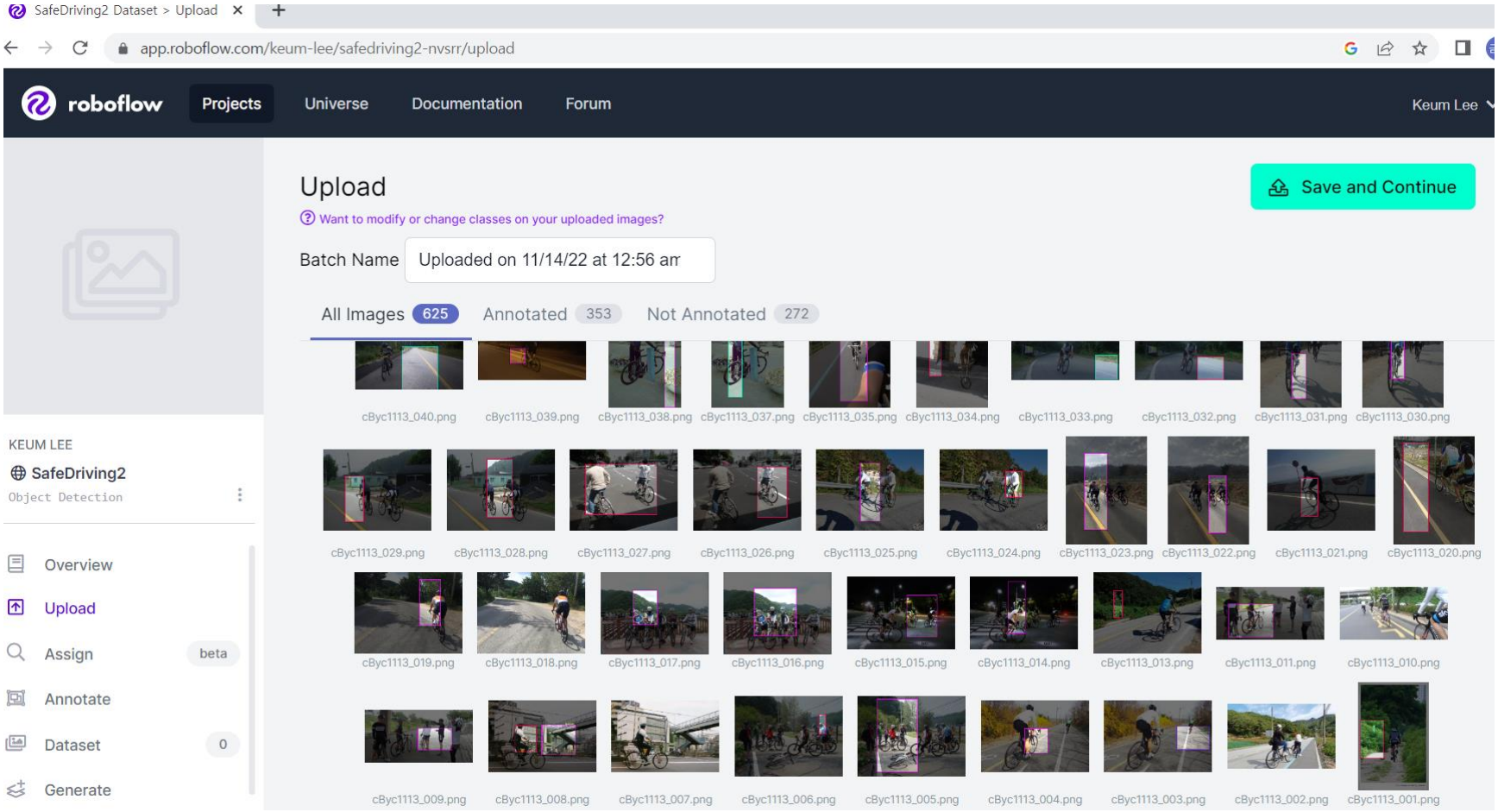

Create Project
Keum Lee / New Public Project
Project Name
SafeDriving2
License
CC BY 4.0
Project Type
Object Detection (Bounding Box)
What will your model predict?
Dash-box
Cancel
Create Public Project


Upload
Want to modify or change classes on your uploaded images?
Batch Name
Uploaded on 11/14/22 at 12:56 am
All Images 0
Annotated 0
Not Annotated 0
Drag and drop
images and annotations
Select Files
Select Folder
Images
jpg, png, bmp
Annotations
in 26 formats »
Video
mov, mp4, avi

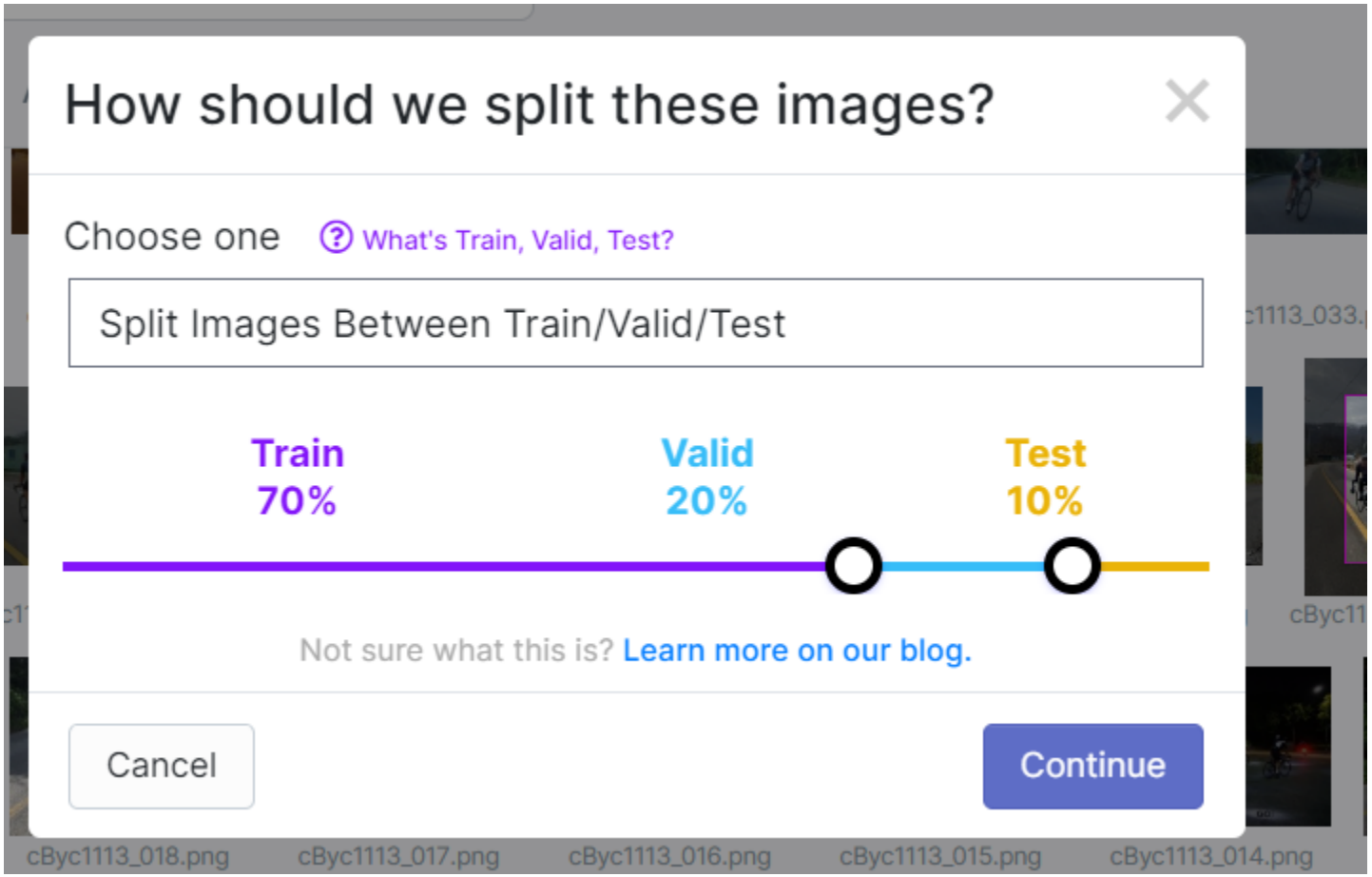
- **Annotation 참고: https://www.youtube.com/watch?v=kr3rvqWLEFE, https://www.youtube.com/watch?v=rV7sYzYvTbA**
- **Upload and drop images and annotations (select folder 를 통해서)**



(images 폴더에서는 '.png', '**.txt', 'name.txt'가 다 들어 있음.)**



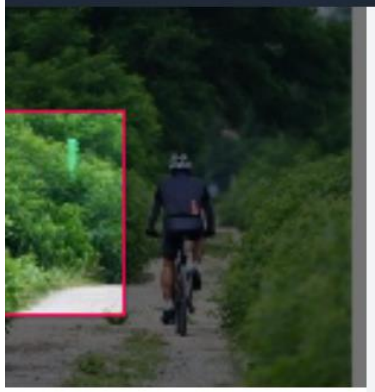
. 우측 상단에서 'Save and Continue' . Train(70%), Valid(20%) 및 Test(10%)로 구분이 ok 이면 'Continue'


How should we split these images?
Choose one
What's Train, Valid, Test?
Split Images Between Train/Valid/Test
Train
70%
Valid
20%
Test
10%
Not sure what this is? Learn more on our blog.
Cancel
Continue
cByc1113_018.png
cByc1113_017.png
cByc1113_016.png
cByc1113_015.png
cByc1113_014.png

SafeDriving2 > Generate New V

app.roboflow.com/keum-lee/safedriving2-nvsrr/generate/preprocessing

roboflow | Projects | Universe | Documentation | Forum



KEUM LEE

SafeDriving2

Object Detection

- Overview
- Upload
- Assign beta
- Annotate
- Dataset 214
- Generate
- Versions

VERSIONS

To train a model, you must first generate a new version of your dataset.

Choose your dataset settings to get started.

Testing Set: 24 images

3 **Preprocessing**

What can preprocessing do?

Decrease training time and increase performance by applying image transformations to all images in this dataset.

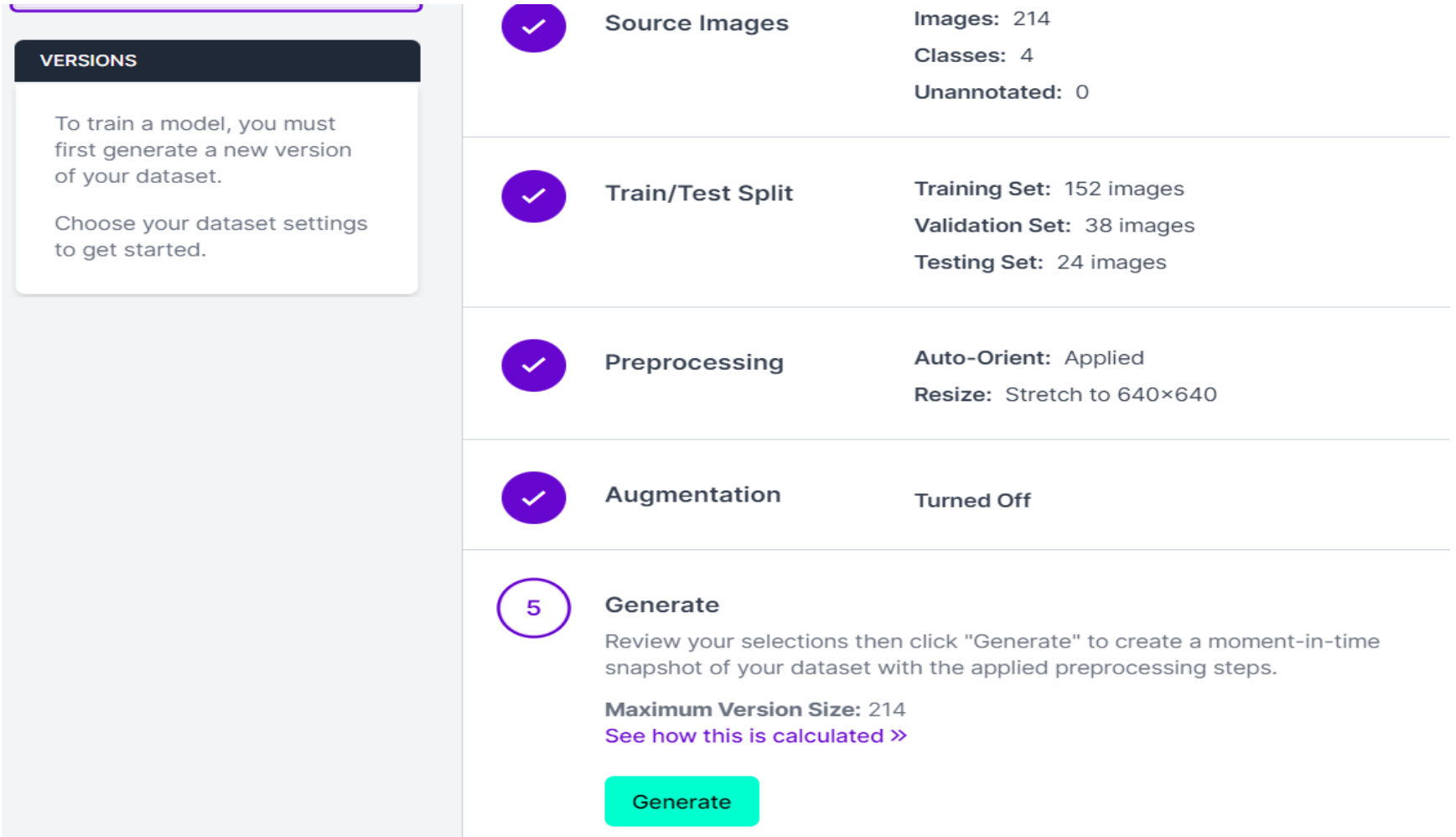
Auto-Orient	Edit ×
Resize Stretch to 640×640	Edit ×
Add Preprocessing Step	

Continue

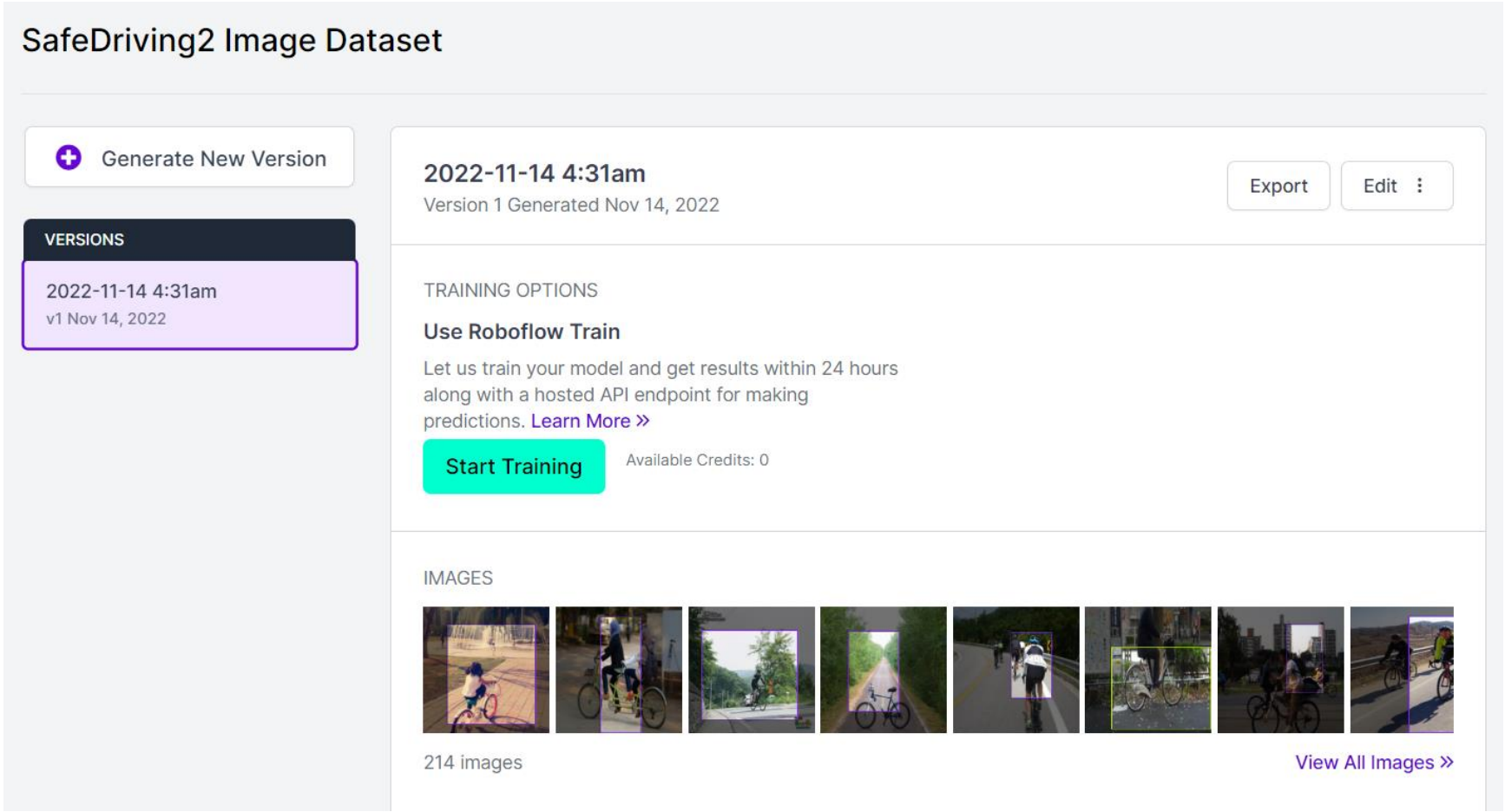
4 **Augmentation**

5 **Generate**

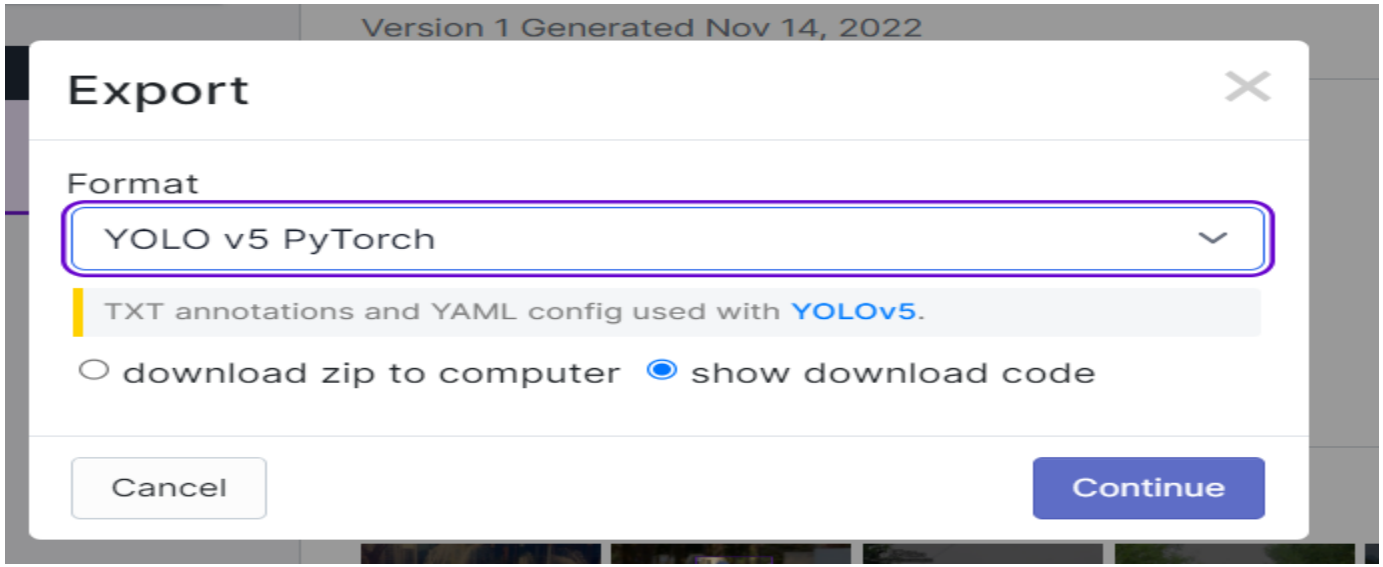
. Generate 클릭



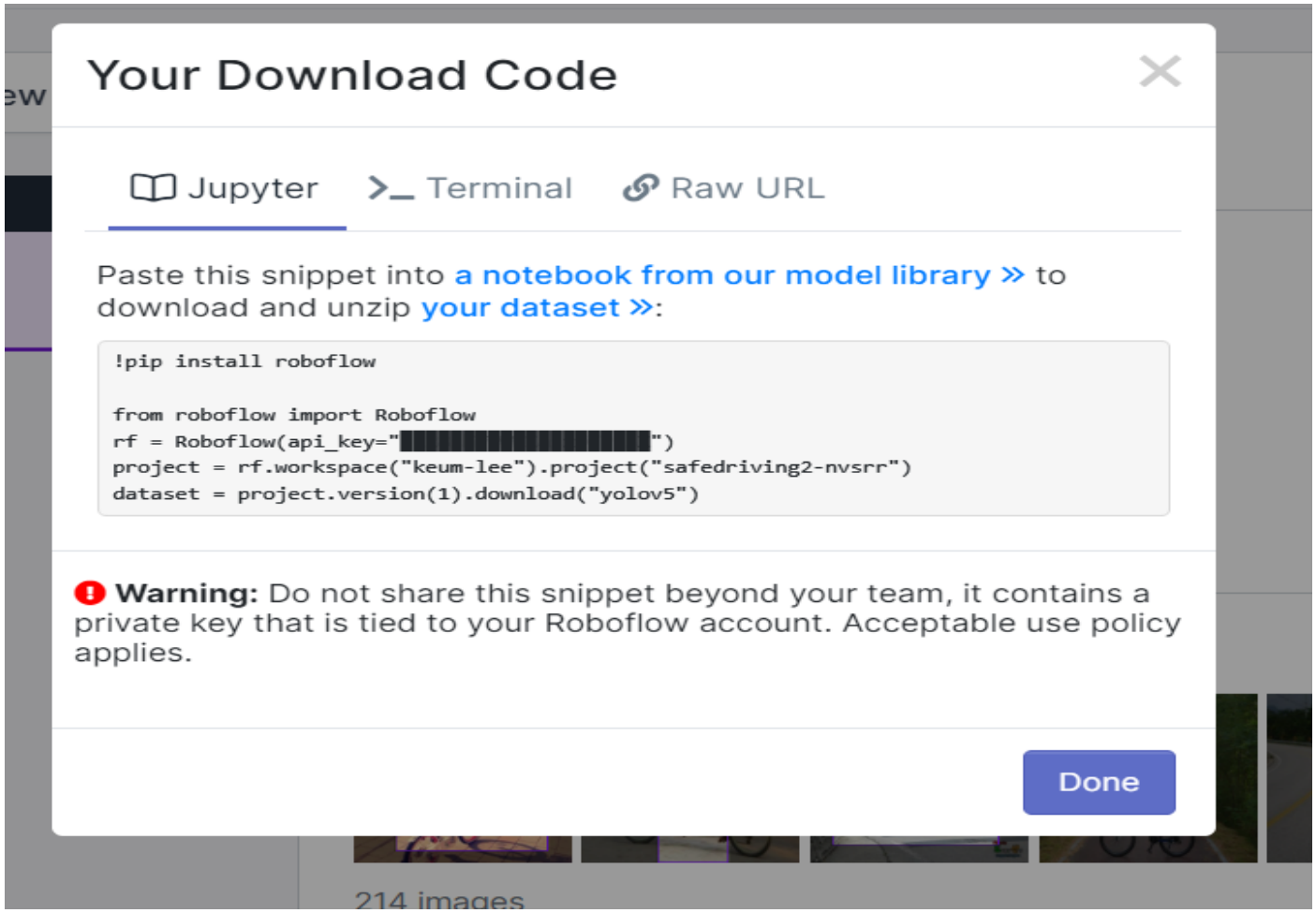
. 아래에서 'Export'



. Format ‘YOLO v5 PyTorch’ 를 선택하고 ‘show download code’를 선택 후 ‘continue’ 클릭




```
!pip install roboflow

from roboflow import Roboflow
rf = Roboflow(api_key="1I28shYwWWZasx0TI9sX")
project = rf.workspace("keum-lee").project("safedriving2-nvsrr")
dataset = project.version(1).download("yolov5")
```



. 이 후는 앞서 권총(pistol) 학습의 순서를 따라 시행