
YOLOv8訓練、驗證&測試

TensorRT

TensorRT

1.卸載torch和torchvision
sudo pip uninstall torch torchvision

2.安裝torch2.1.0
2-1先去https://forums.developer.nvidia.com/t/pytorch-for-jetson/72048 **下載2.1.0**
or moodle下載檔案

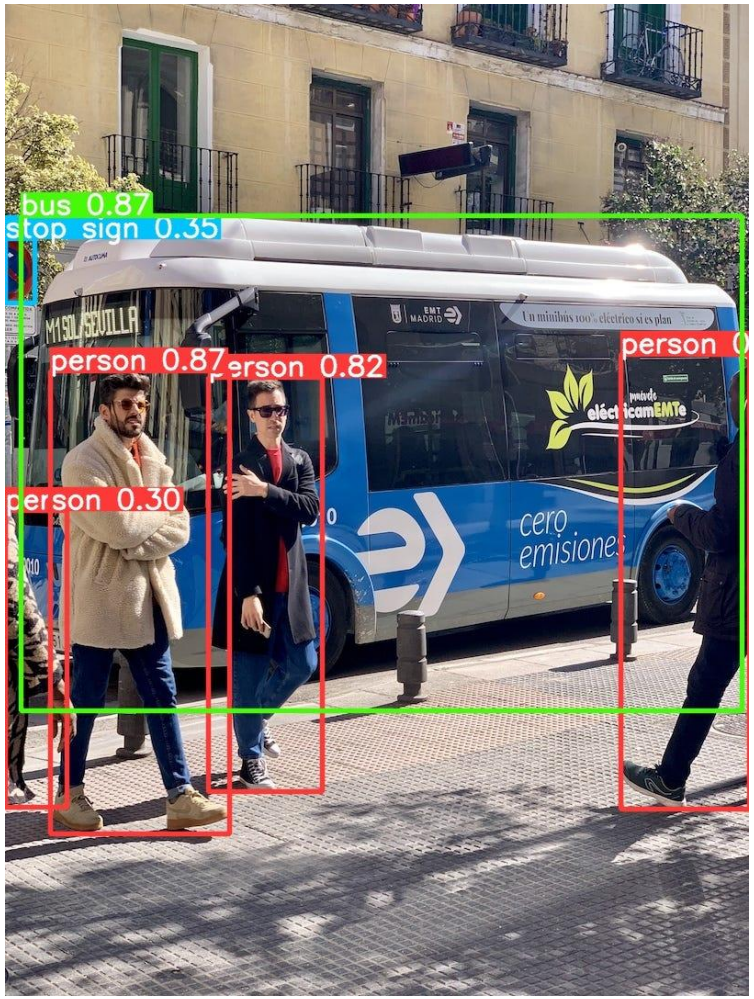
2-2執行以下指令
sudo apt-get install python3-pip libopenblas-base libopenmpi-dev
pip install Cython
pip install torch-2.1.0-cp38-cp38m-linux_aarch64.whl

3.安裝torchvision0.16.0
sudo apt-get install libjpeg-dev zlib1g-dev libpython3-dev libavcodec-dev libavformat-dev libswscale-dev
git clone --branch v0.16.0 https://github.com/pytorch/vision torchvision
cd torchvision
export BUILD_VERSION=0.16.0
python3 setup.py install --user

YOLOv8

CLI:

```
yolo predict model=yolov8n.pt source='https://ultralytics.com/images/bus.jpg'
```



Python:

```
from ultralytics import YOLO

# Load a model
model = YOLO(  “yolov8n.pt")  # load a pretrained model (recommended for training)

# evaluate model performance on the validation set
results = model("https://ultralytics.com/images/bus.jpg")
```

YOLOv8

YOLOv8→TensorRT

pip install cmake==3.27.5

pip install onnxsim

yolo export model=yolov8n.pt format=engine

format	'torchscript'	格式导出到
imgsz	640	图像尺寸标量或（高，宽）列表，即（640，480）
keras	False	使用 Keras 进行TF SavedModel 导出
optimize	False	TorchScript优化移动设备
half	False	FP16 量化
int8	False	INT8 量化
dynamic	False	ONNX/TensorRT：动态轴
simplify	False	ONNX/TensorRT: 简化模型
opset	None	ONNX：opset 版本（可选，默认为最新版本）
workspace	4	TensorRT：工作空间大小（GB）
nms	False	CoreML文件：添加 NMS

```
WARNING ⚠️ TensorRT requires GPU export, automatically assigning device=0
Ultralytics YOLOv8.1.9 🚀 Python-3.8.10 torch-2.1.0a0+41361538.nv23.06 CUDA:0 (Orin, 6481MiB)
YOLOv8n summary (fused): 168 layers, 3151904 parameters, 0 gradients, 8.7 GFLOPs

PyTorch: starting from 'yolov8n.pt' with input shape (1, 3, 640, 640) BCHW and output shape(s) (1, 84, 8400) (6.2 MB)

ONNX: starting export with onnx 1.15.0 opset 17...
====== Diagnostic Run torch.onnx.export version 2.1.0a0+41361538.nv23.06 =======
verbose: False, log level: Level.ERROR
======================== 0 NONE 0 NOTE 0 WARNING 0 ERROR ========================

ONNX: export success ✅ 1.3s, saved as 'yolov8n.onnx' (12.2 MB)
```

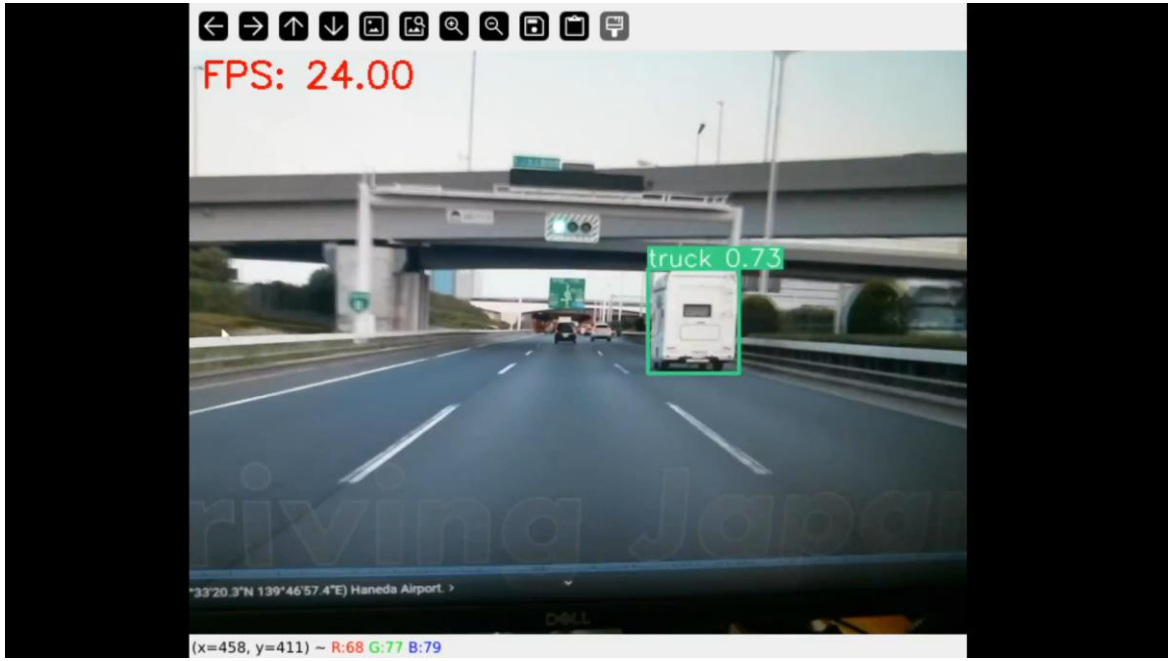
```
TensorRT: starting export with TensorRT 8.5.2.2...
[02/16/2024-15:26:31] [TRT] [I] [MemUsageChange] Init CUDA: CPU +215, GPU -1, now: CPU 1849, GPU 5397 (MiB)
[02/16/2024-15:26:33] [TRT] [I] [MemUsageChange] Init builder kernel library: CPU +302, GPU +429, now: CPU 2174, GPU 5708 (MiB)
[02/16/2024-15:26:33] [TRT] [I] ----------------------------------------------------------------
[02/16/2024-15:26:33] [TRT] [I] Input filename:   yolov8n.onnx
[02/16/2024-15:26:33] [TRT] [I] ONNX IR version:  0.0.8
[02/16/2024-15:26:33] [TRT] [I] Opset version:    17
[02/16/2024-15:26:33] [TRT] [I] Producer name:    pytorch
[02/16/2024-15:26:33] [TRT] [I] Producer version: 2.1.0
[02/16/2024-15:26:33] [TRT] [I] Domain:
[02/16/2024-15:26:33] [TRT] [I] Model version:    0
[02/16/2024-15:26:33] [TRT] [I] Doc string:
[02/16/2024-15:26:33] [TRT] [I] ----------------------------------------------------------------
[02/16/2024-15:26:34] [TRT] [W] onnx2trt_utils.cpp:375: Your ONNX model has been generated with INT64 weights, while TensorRT does not natively support INT64. Attempting to cast down to INT32.
TensorRT: input "images" with shape(1, 3, 640, 640) DataType.FLOAT
TensorRT: output "output0" with shape(1, 84, 8400) DataType.FLOAT
TensorRT: building FP32 engine as yolov8n.engine
```

YOLOv8

嘗試改成用相機去讀取

yolo export model=yolov8n.pt format=engine

yolo detect predict model=yolov8m.engine source= ‘bus.jpg’ —show



TensorRT

Original model

目標

1.使用fp16及fp32去比較速度差距

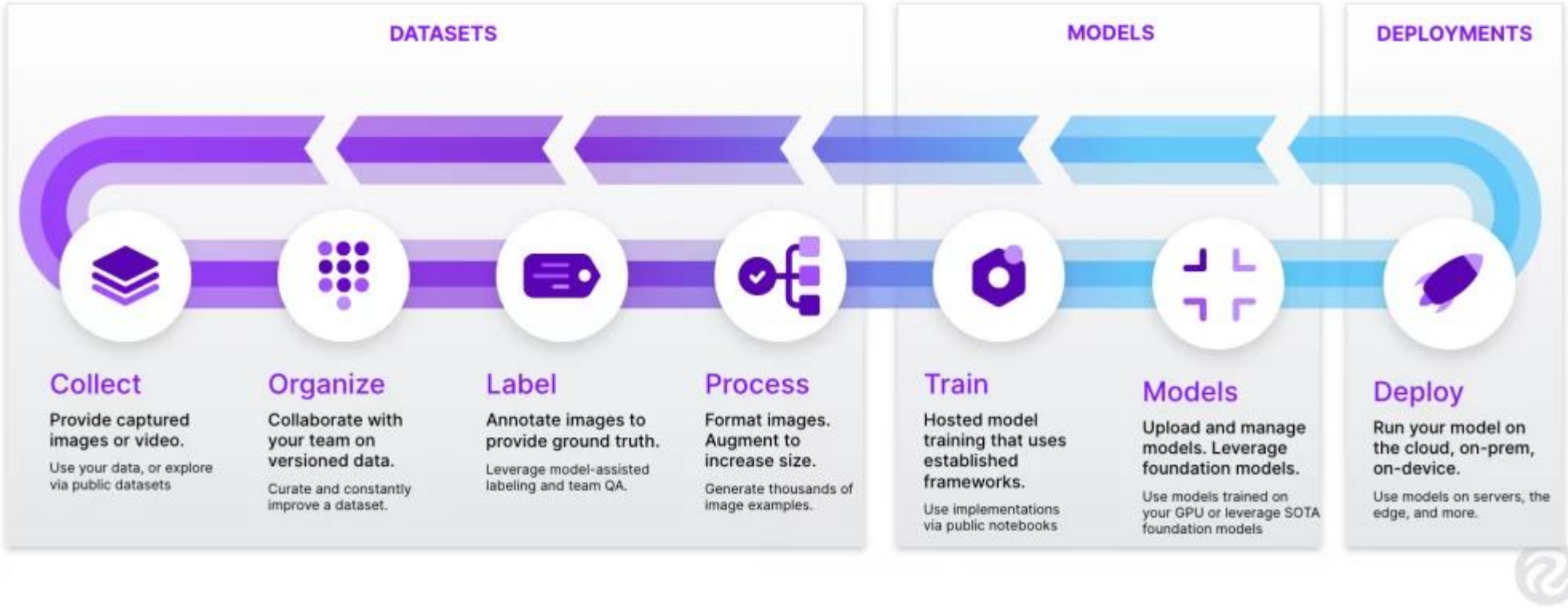
資料集標註

roboflow

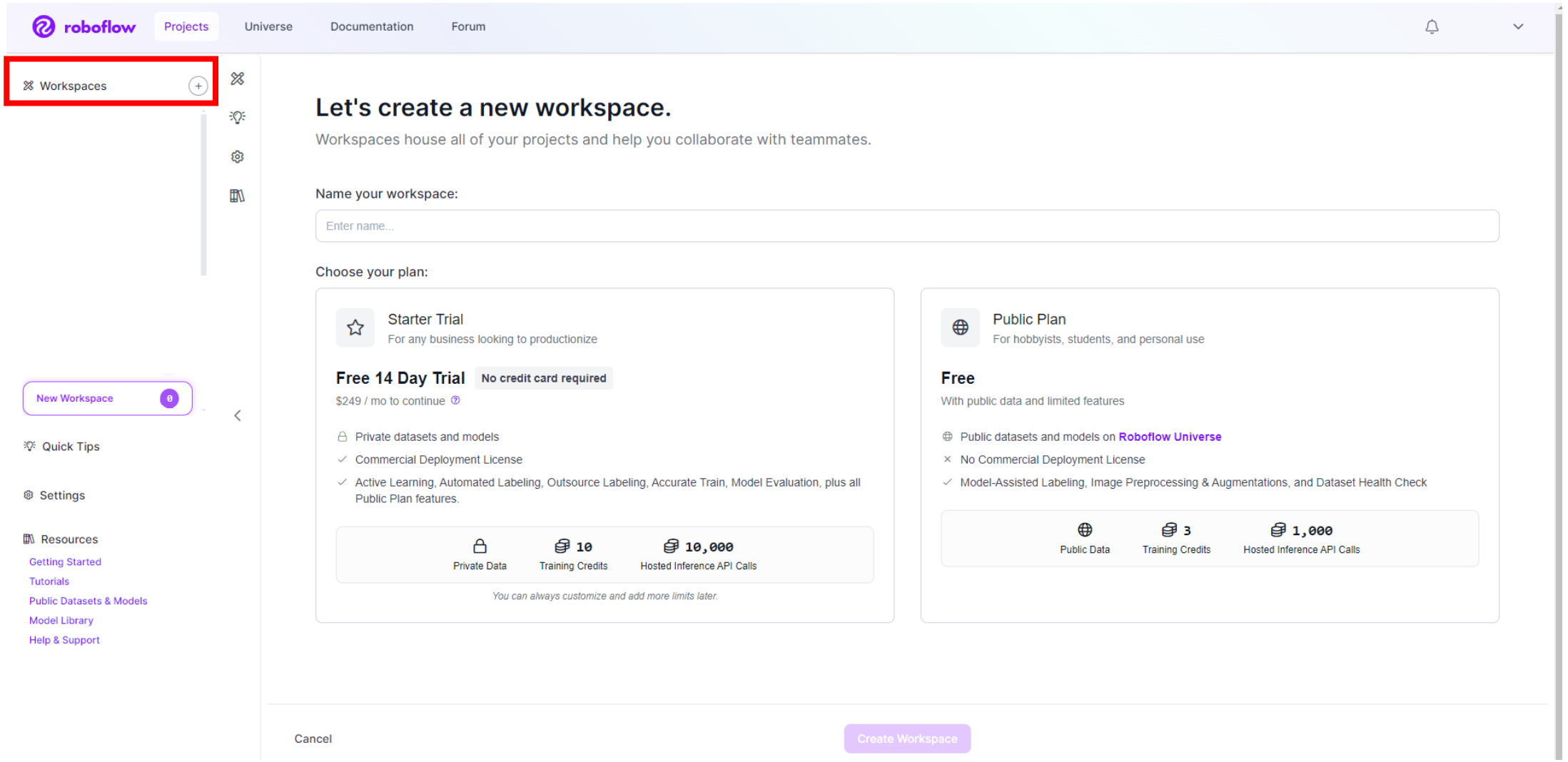
roboflow

Roboflow provides a full computer vision pipeline

Roboflow has products for each step of the computer vision pipeline and the ability to integrate with existing solutions for an interoperable approach to customer needs



roboflow


roboflow
Projects
Universe
Documentation
Forum
Workspaces
Let's create a new workspace.
Workspaces house all of your projects and help you collaborate with teammates.
Name your workspace:
Enter name...
Choose your plan:
Starter Trial
For any business looking to productionize
Free 14 Day Trial
No credit card required
$249 / mo to continue
Private datasets and models
Commercial Deployment License
Active Learning, Automated Labeling, Outsource Labeling, Accurate Train, Model Evaluation, plus all Public Plan features.
Private Data
10
Training Credits
10,000
Hosted Inference API Calls
You can always customize and add more limits later.
Public Plan
For hobbyists, students, and personal use
Free
With public data and limited features
Public datasets and models on Roboflow Universe
No Commercial Deployment License
Model-Assisted Labeling, Image Preprocessing & Augmentations, and Dataset Health Check
Public Data
3
Training Credits
1,000
Hosted Inference API Calls
New Workspace
0
Quick Tips
Settings
Resources
Getting Started
Tutorials
Public Datasets & Models
Model Library
Help & Support
Cancel
Create Workspace

roboflow

Let's create a new workspace.

Workspaces house all of your projects and help you collaborate with teammates.

Name your workspace:

face

Choose your plan:

Starter Trial

For any business looking to productionize

Free 14 Day Trial No credit card required

$249 / mo to continue

- Private datasets and models
- Commercial Deployment License
- Active Learning, Automated Labeling, Outsource Labeling, Accurate Train, Model Evaluation, plus all Public Plan features.

Private Data	Training Credits	Hosted Inference API Calls
	10	10,000

You can always customize and add more limits later.

Public Plan

For hobbyists, students, and personal use

Free

With public data and limited features

- Public datasets and models on **Roboflow Universe**
- No Commercial Deployment License
- Model-Assisted Labeling, Image Preprocessing & Augmentations, and Dataset Health Check

Public Data	Training Credits	Hosted Inference API Calls
	3	1,000

Create Workspace

roboflow

Invite teammates.

Add collaborators to help with labeling, upload data, train models, and more.

Invite Teammates via Email: 2 invites available

joe@email.com, sara@email.com

Role: Admin

Skip Invite Teammates

roboflow

Let's create your project.

face > New Public Project

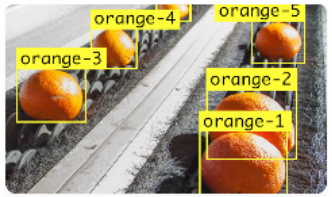
Project Name

face

License

CC BY 4.0

Project Type



Object Detection

Identify objects and their positions with bounding boxes.

Best For

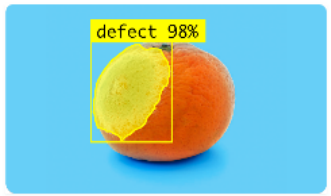
Counting | Tracking

Classification

Assign labels to the entire image.

Best For

Filtering | ✓ Content Moderation



Instance Segmentation

Detect multiple objects and their actual shape.

Best For

Measurements | Odd Shapes

Show More ↓

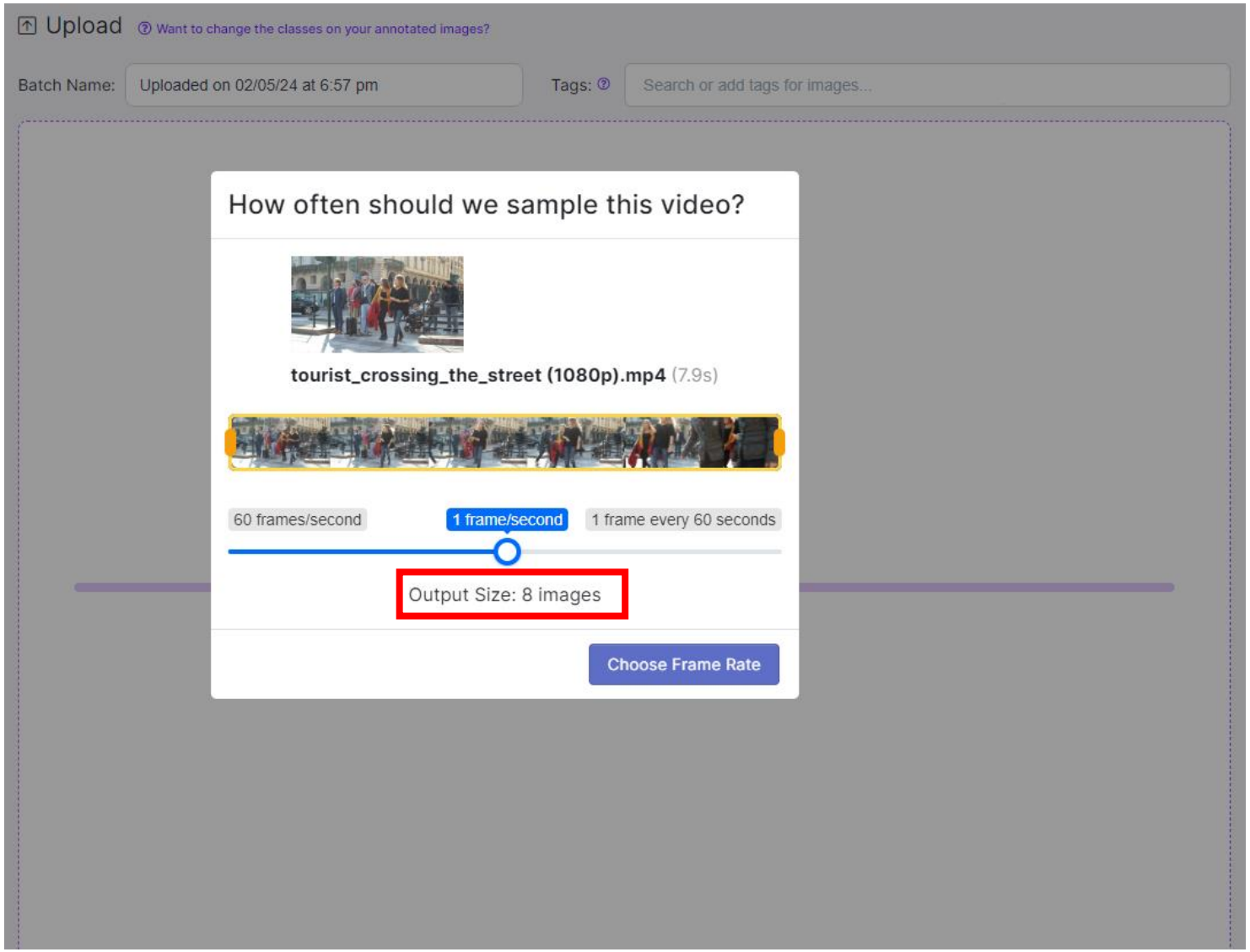
Annotation Group

face

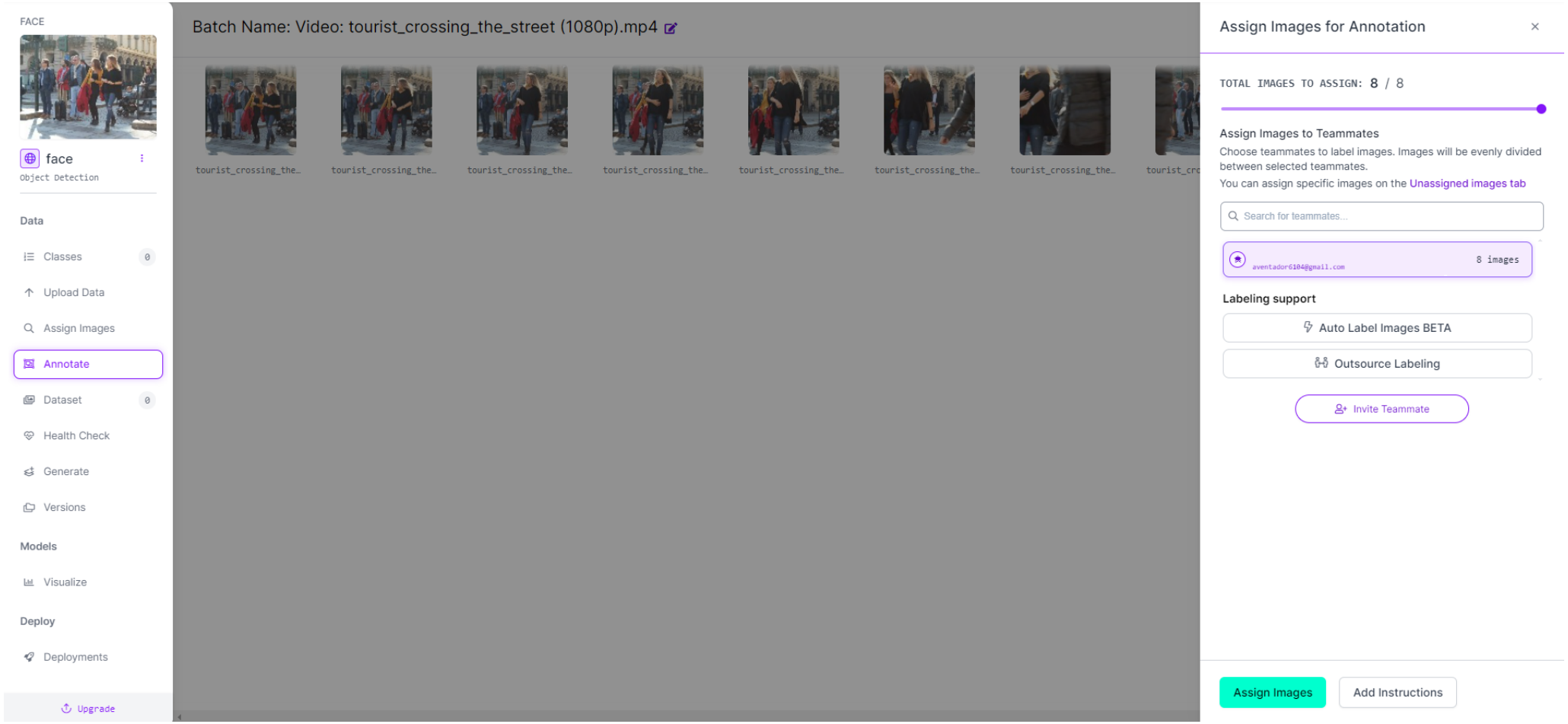
Cancel

Create Public Project

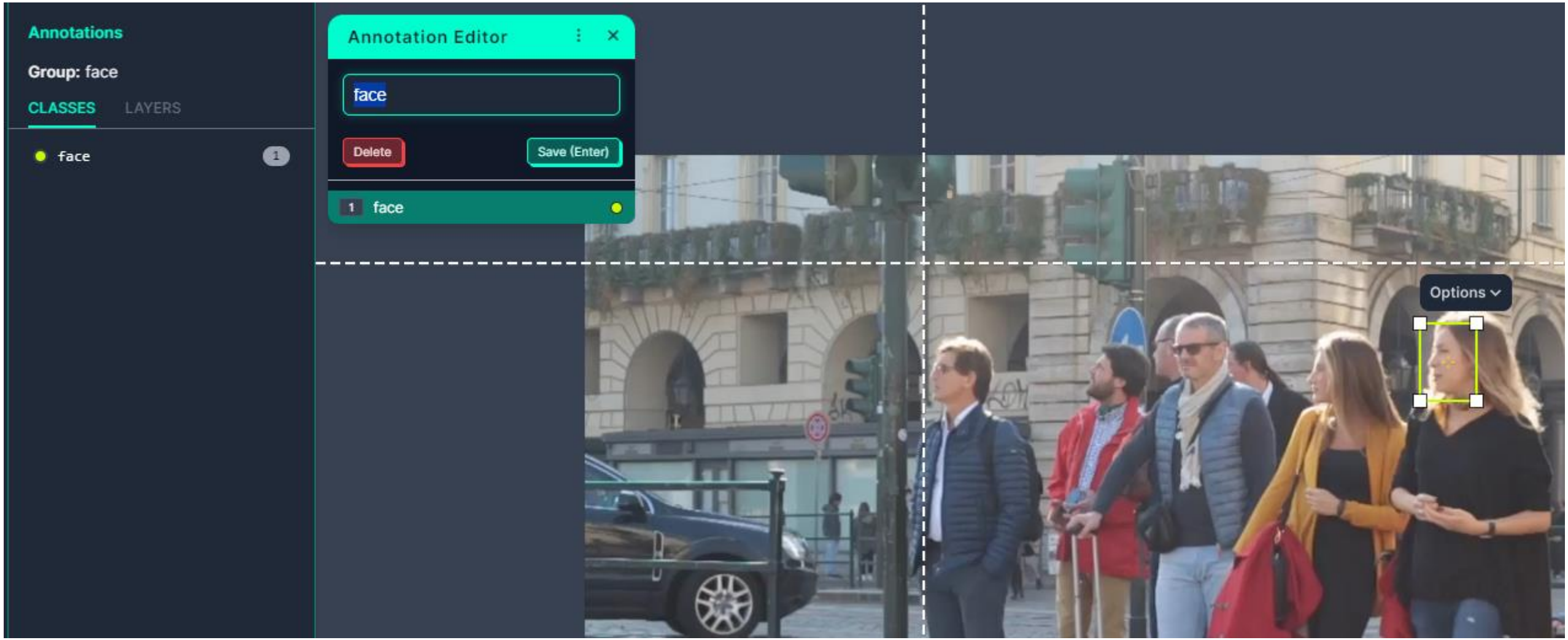
roboflow


Upload
Want to change the classes on your annotated images?
Batch Name:
Uploaded on 02/05/24 at 6:57 pm
Tags:
Search or add tags for images...
How often should we sample this video?
tourist_crossing_the_street (1080p).mp4 (7.9s)
60 frames/second
1 frame/second
1 frame every 60 seconds
Output Size: 8 images
Choose Frame Rate

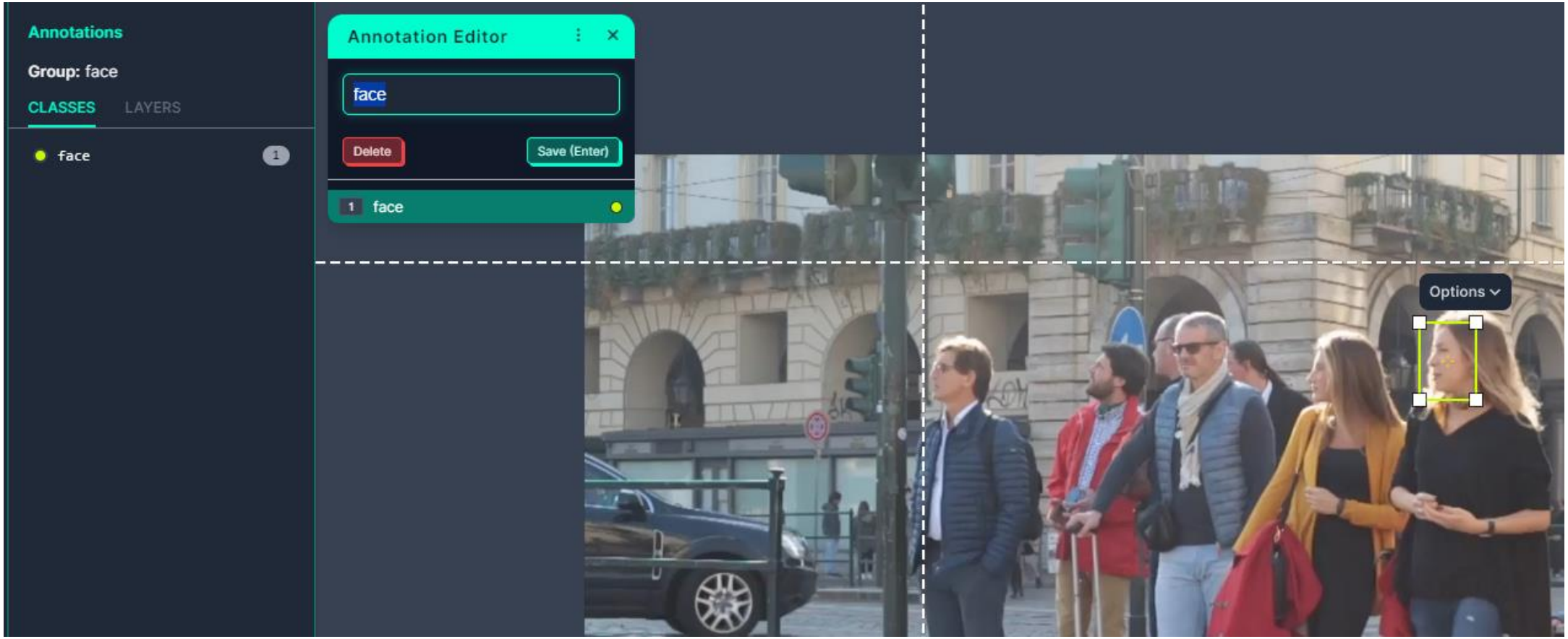
roboflow


FACE
face
Object Detection
Data
Classes
Upload Data
Assign Images
Annotate
Dataset
Health Check
Generate
Versions
Models
Visualize
Deploy
Deployments
Upgrade
Batch Name: Video: tourist_crossing_the_street (1080p).mp4
Assign Images for Annotation
TOTAL IMAGES TO ASSIGN: 8 / 8
Assign Images to Teammates
Choose teammates to label images. Images will be evenly divided between selected teammates.
You can assign specific images on the Unassigned images tab
Search for teammates...
8 images
Labeling support
Auto Label Images BETA
Outsource Labeling
Invite Teammate
Assign Images
Add Instructions

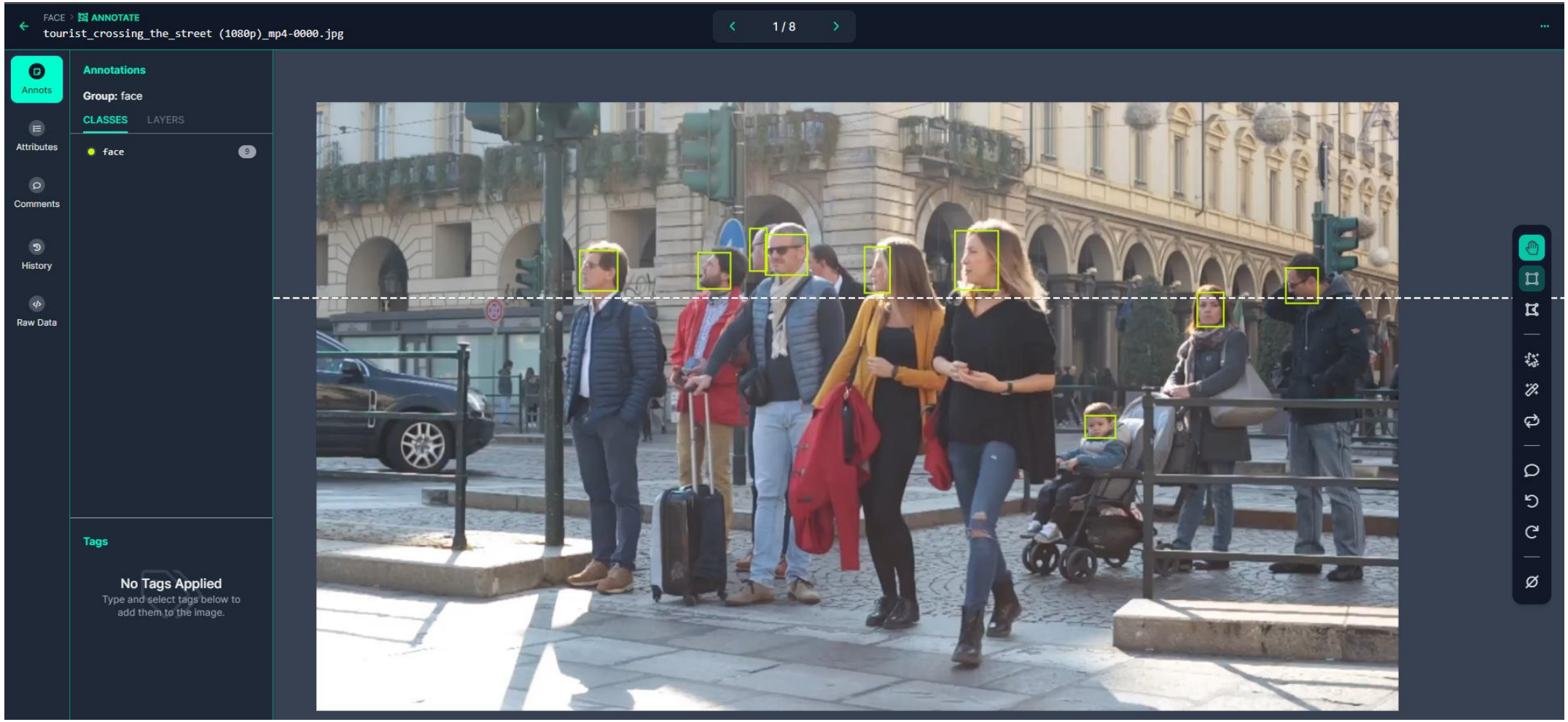
roboflow


Annotations
Group: face
CLASSES
LAYERS
face
1
Annotation Editor
face
Delete
Save (Enter)
1
face
Options

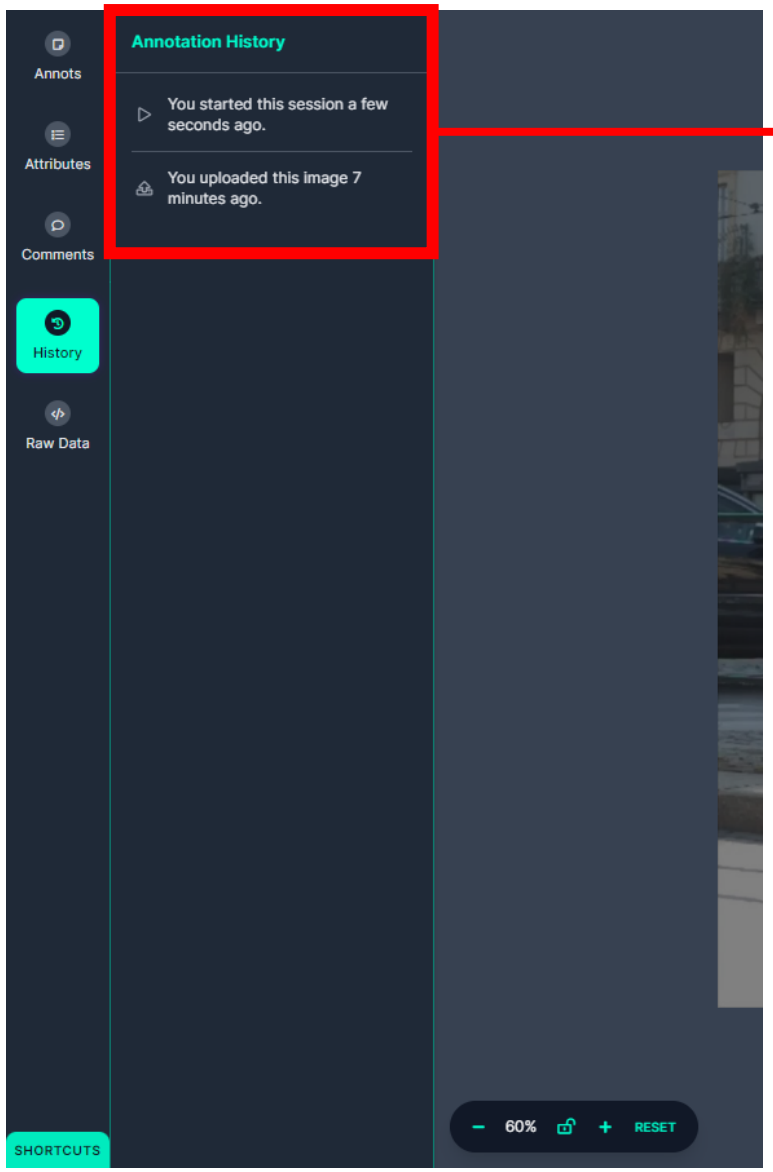
roboflow


Annotations
Group: face
CLASSES
LAYERS
face
1
Annotation Editor
face
Delete
Save (Enter)
1
face
Options

roboflow

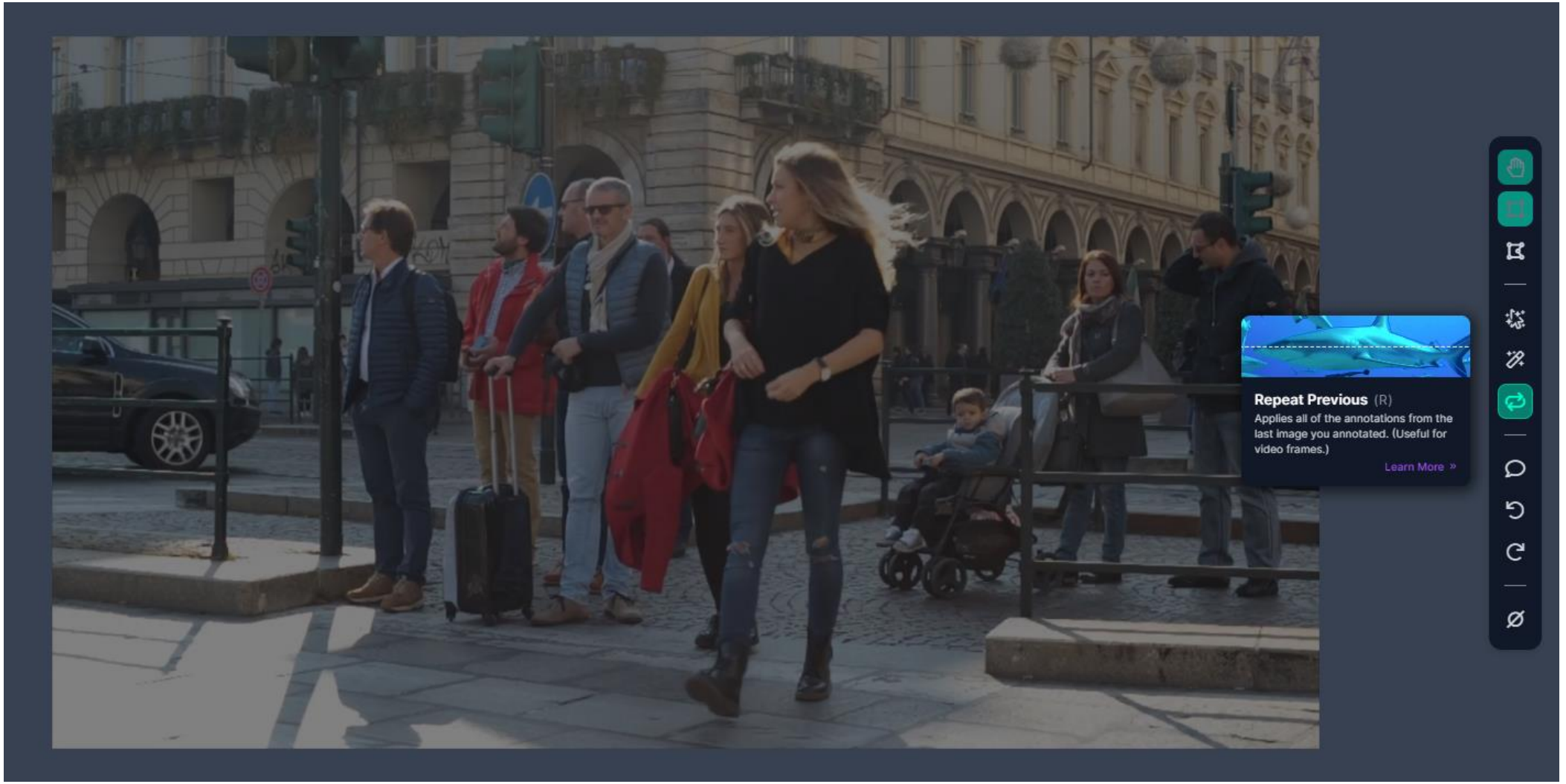

FACE
ANNOTATE
tourist_crossing_the_street (1080p)_mp4-0000.jpg
1 / 8
Annots
Attributes
Comments
History
Raw Data
Annotations
Group: face
CLASSES
LAYERS
face
9
Tags
No Tags Applied
Type and select tags below to add them to the image.

roboflow

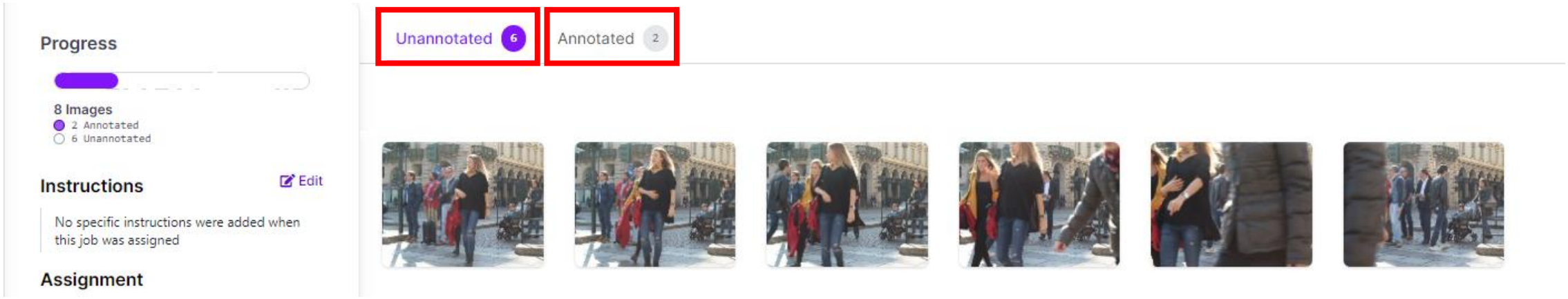


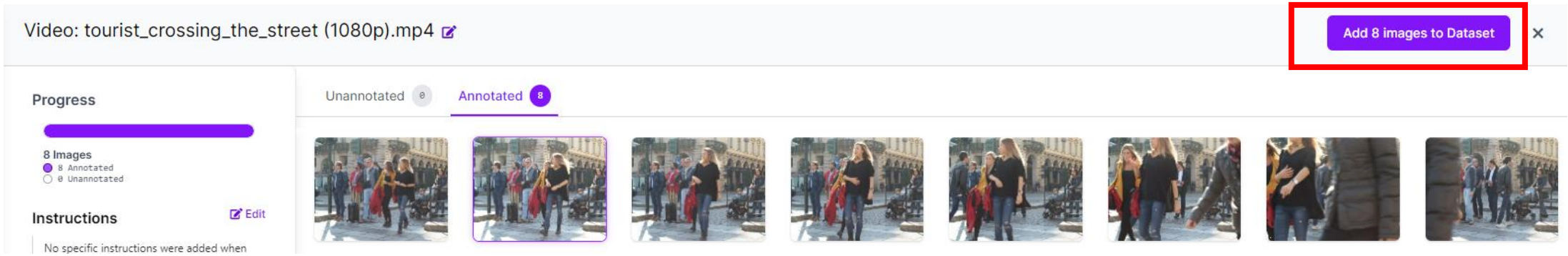
歷史紀錄:
因網路問題容易造成重複標註，可以透過這裡去看戰犯(X
建議在一開始就將資料集切開，就互相不影響。

roboflow

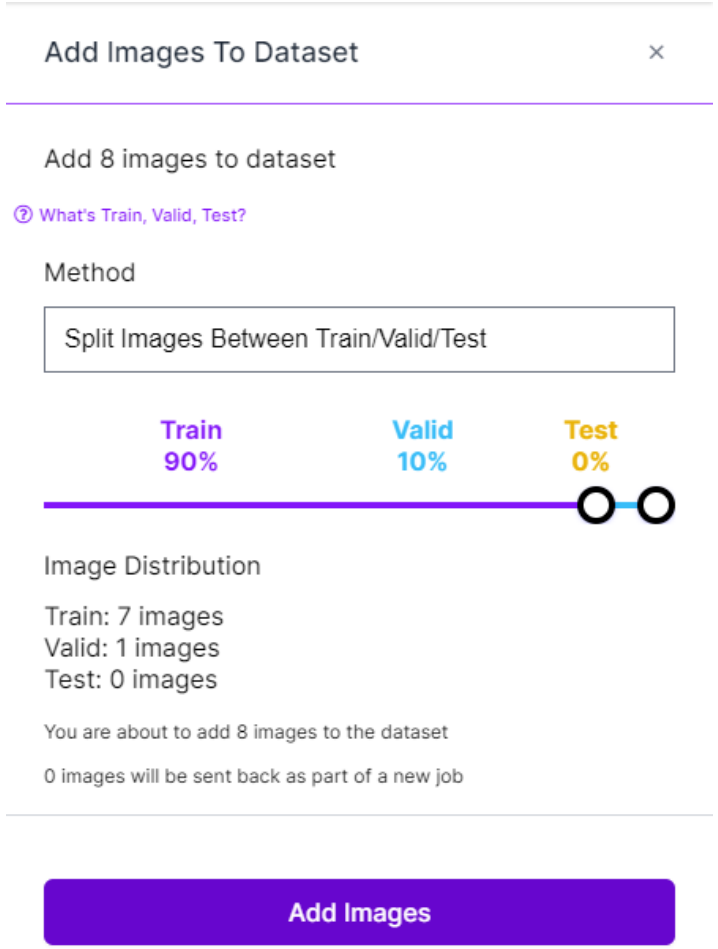

Repeat Previous (R)
Applies all of the annotations from the last image you annotated. (Useful for video frames.)
Learn More »

roboflow


Progress
8 Images
2 Annotated
6 Unannotated
Instructions
Edit
No specific instructions were added when this job was assigned
Assignment
Unannotated 6
Annotated 2


Video: tourist_crossing_the_street (1080p).mp4
Add 8 images to Dataset
Progress
8 Images
8 Annotated
0 Unannotated
Instructions
Edit
No specific instructions were added when
Unannotated 0
Annotated 8

roboflow


Add Images To Dataset
Add 8 images to dataset
What's Train, Valid, Test?
Method
Split Images Between Train/Valid/Test
Train
90%
Valid
10%
Test
0%
Image Distribution
Train: 7 images
Valid: 1 images
Test: 0 images
You are about to add 8 images to the dataset
0 images will be sent back as part of a new job
Add Images

roboflow

FACE

face

Object Detection

Data

- Classes 1
- Upload Data
- Assign Images
- Annotate
- Dataset 8
- Health Check
- Generate
- Versions

Models

- Visualize

Deploy

- Deployments

Upgrade

VERSIONS

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

Choose your dataset settings to get started.

Source Images

Images: 8
Classes: 1
Unannotated: 0

Train/Test Split

Training Set: 7 images
Validation Set: 1 images
Testing Set: 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 ×

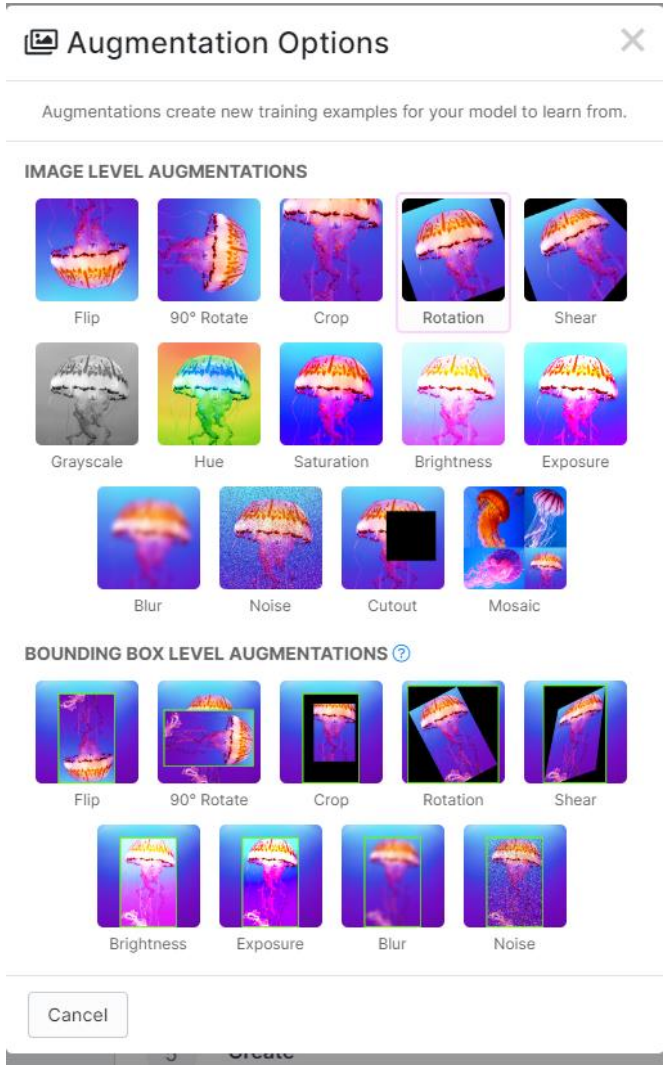
Add Preprocessing Step

Continue

4 **Augmentation**

5 **Create**

roboflow



5

Create

Review your selections and select a version size to create a moment-in-time snapshot of your dataset with the applied transformations.

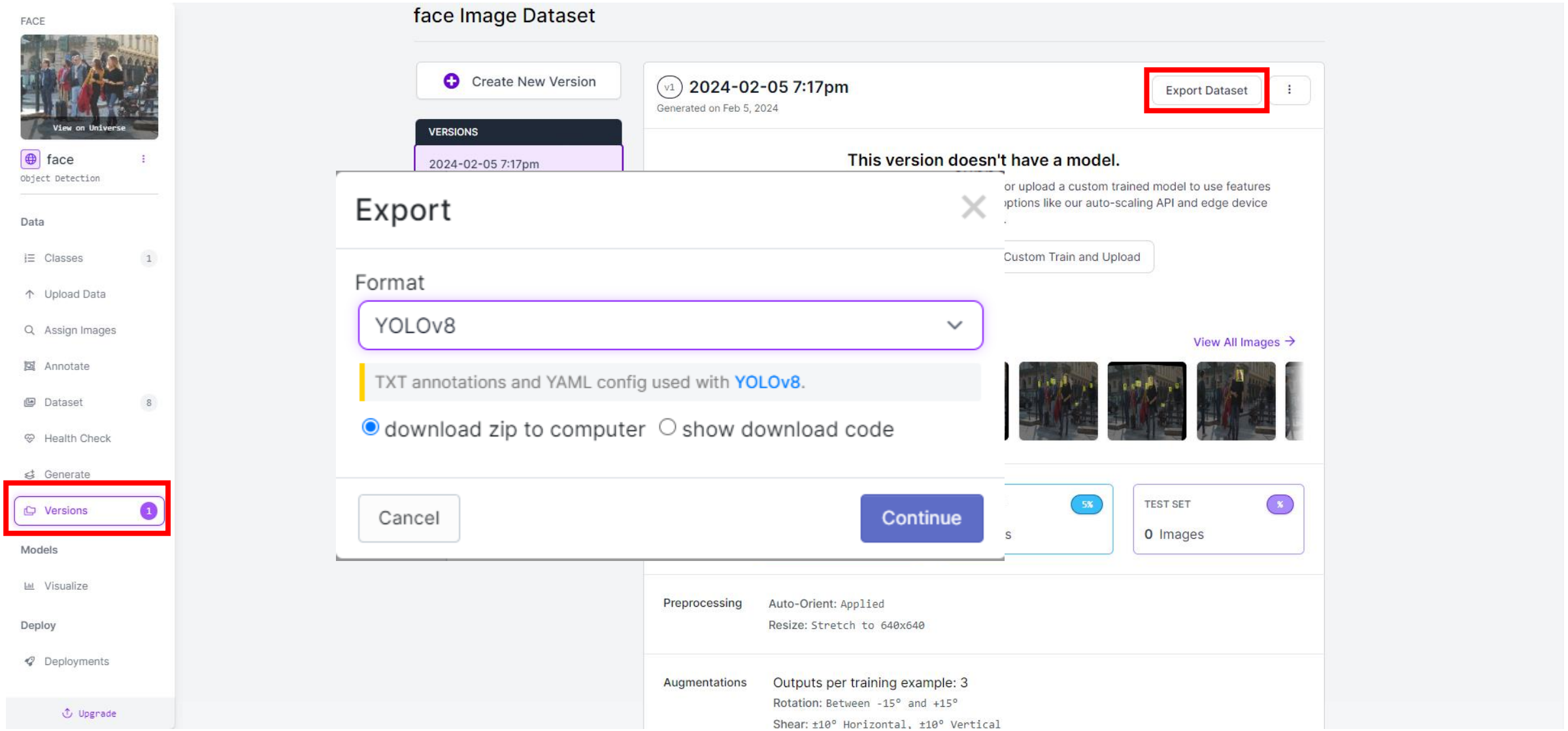
Larger versions take longer to train but often result in better model performance. See how this is calculated »

Maximum Version Size

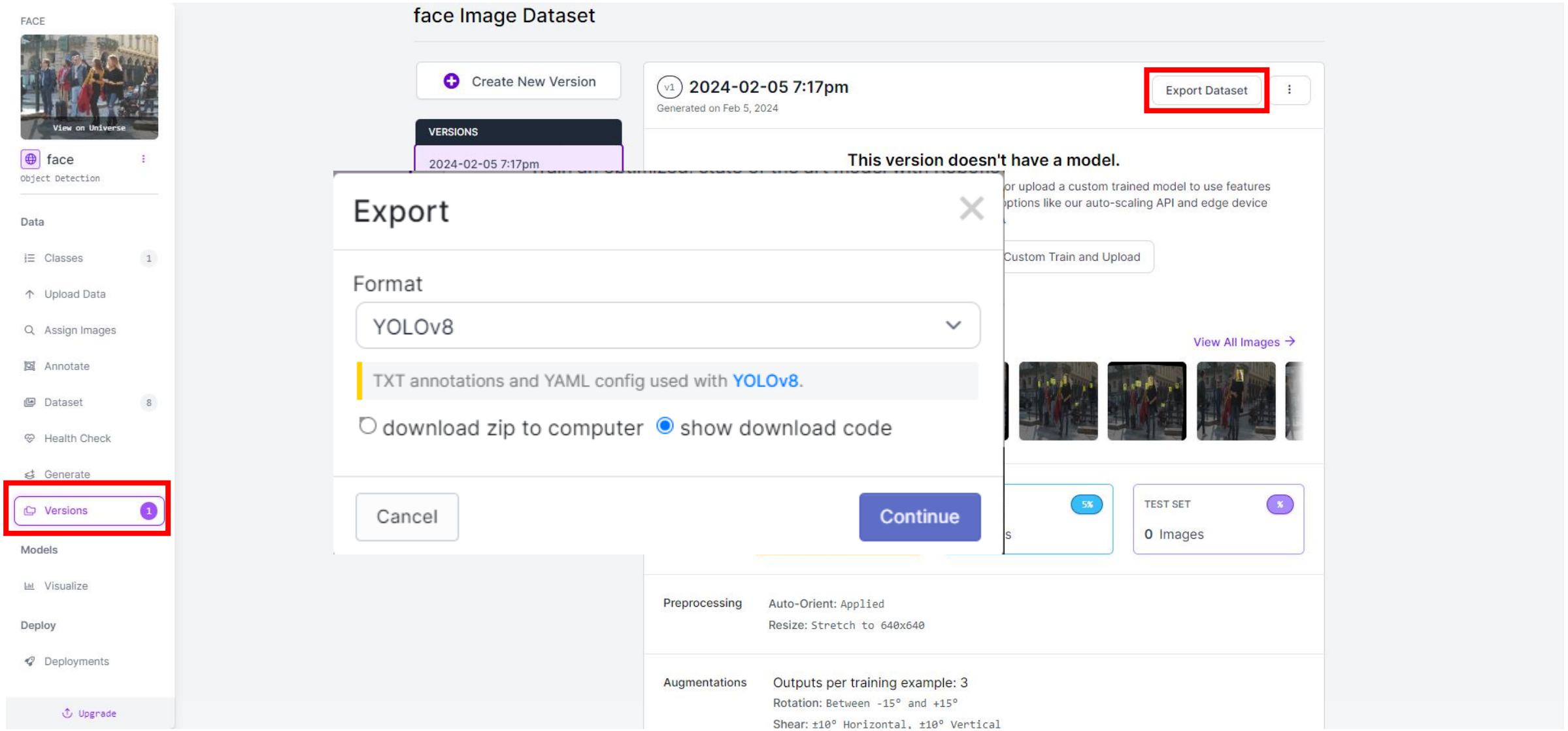
22 images (3x)

Create

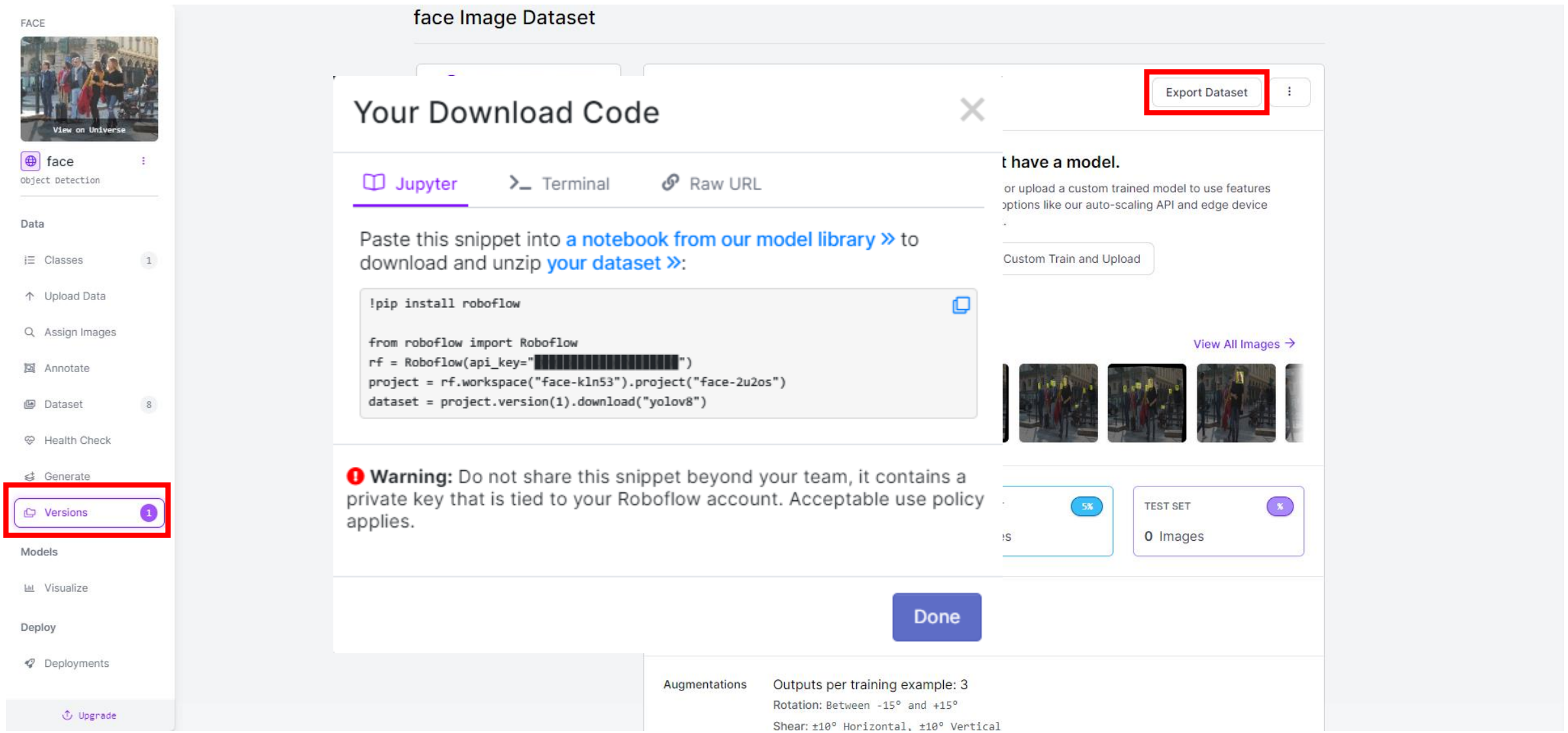
roboflow


FACE
View on Universe
face
Object Detection
Data
Classes 1
Upload Data
Assign Images
Annotate
Dataset 8
Health Check
Generate
Versions 1
Models
Visualize
Deploy
Deployments
Upgrade
face Image Dataset
Create New Version
VERSIONS
2024-02-05 7:17pm
v1 2024-02-05 7:17pm
Generated on Feb 5, 2024
Export Dataset
This version doesn't have a model.
or upload a custom trained model to use features
options like our auto-scaling API and edge device
Custom Train and Upload
View All Images
Export
Format
YOLOv8
TXT annotations and YAML config used with YOLOv8.
download zip to computer
show download code
Cancel
Continue
5%
TEST SET
%
0 Images
Preprocessing
Auto-Orient: Applied
Resize: Stretch to 640x640
Augmentations
Outputs per training example: 3
Rotation: Between -15° and +15°
Shear: ±10° Horizontal, ±10° Vertical

roboflow


FACE
View on Universe
face
Object Detection
Data
Classes 1
Upload Data
Assign Images
Annotate
Dataset 8
Health Check
Generate
Versions 1
Models
Visualize
Deploy
Deployments
Upgrade
face Image Dataset
Create New Version
VERSIONS
2024-02-05 7:17pm
v1 2024-02-05 7:17pm
Generated on Feb 5, 2024
Export Dataset
This version doesn't have a model.
or upload a custom trained model to use features
options like our auto-scaling API and edge device
Custom Train and Upload
View All Images
Export
Format
YOLOv8
TXT annotations and YAML config used with YOLOv8.
download zip to computer
show download code
Cancel
Continue
5%
TEST SET
%
0 Images
Preprocessing
Auto-Orient: Applied
Resize: Stretch to 640x640
Augmentations
Outputs per training example: 3
Rotation: Between -15° and +15°
Shear: ±10° Horizontal, ±10° Vertical

roboflow


FACE
View on Universe
face
Object Detection
Data
Classes 1
Upload Data
Assign Images
Annotate
Dataset 8
Health Check
Generate
Versions 1
Models
Visualize
Deploy
Deployments
Upgrade
face Image Dataset
Export Dataset
Your Download Code
Jupyter
Terminal
Raw URL
Paste this snippet into a notebook from our model library » to download and unzip your dataset »:
!pip install roboflow
from roboflow import Roboflow
rf = Roboflow(api_key="[redacted]")
project = rf.workspace("face-kln53").project("face-2u2os")
dataset = project.version(1).download("yolov8")
Warning: Do not share this snippet beyond your team, it contains a private key that is tied to your Roboflow account. Acceptable use policy applies.
Done
t have a model.
or upload a custom trained model to use features
options like our auto-scaling API and edge device
Custom Train and Upload
View All Images
TEST SET
0 Images
Augmentations
Outputs per training example: 3
Rotation: Between -15° and +15°
Shear: ±10° Horizontal, ±10° Vertical

YOLOv8訓練、驗證&測試

YOLOv8

Training:

yolo detect train data=data.yaml model=yolov8n.pt epochs=100 imgsz=640

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

nc: 1
names: ['face']

roboflow:
  workspace: face-kln53
  project: face-2u2os
  version: 1
  license: CC BY 4.0
  url: https://universe.roboflow.com/face-kln53/face-2u2os/dataset/1
```

data.yaml

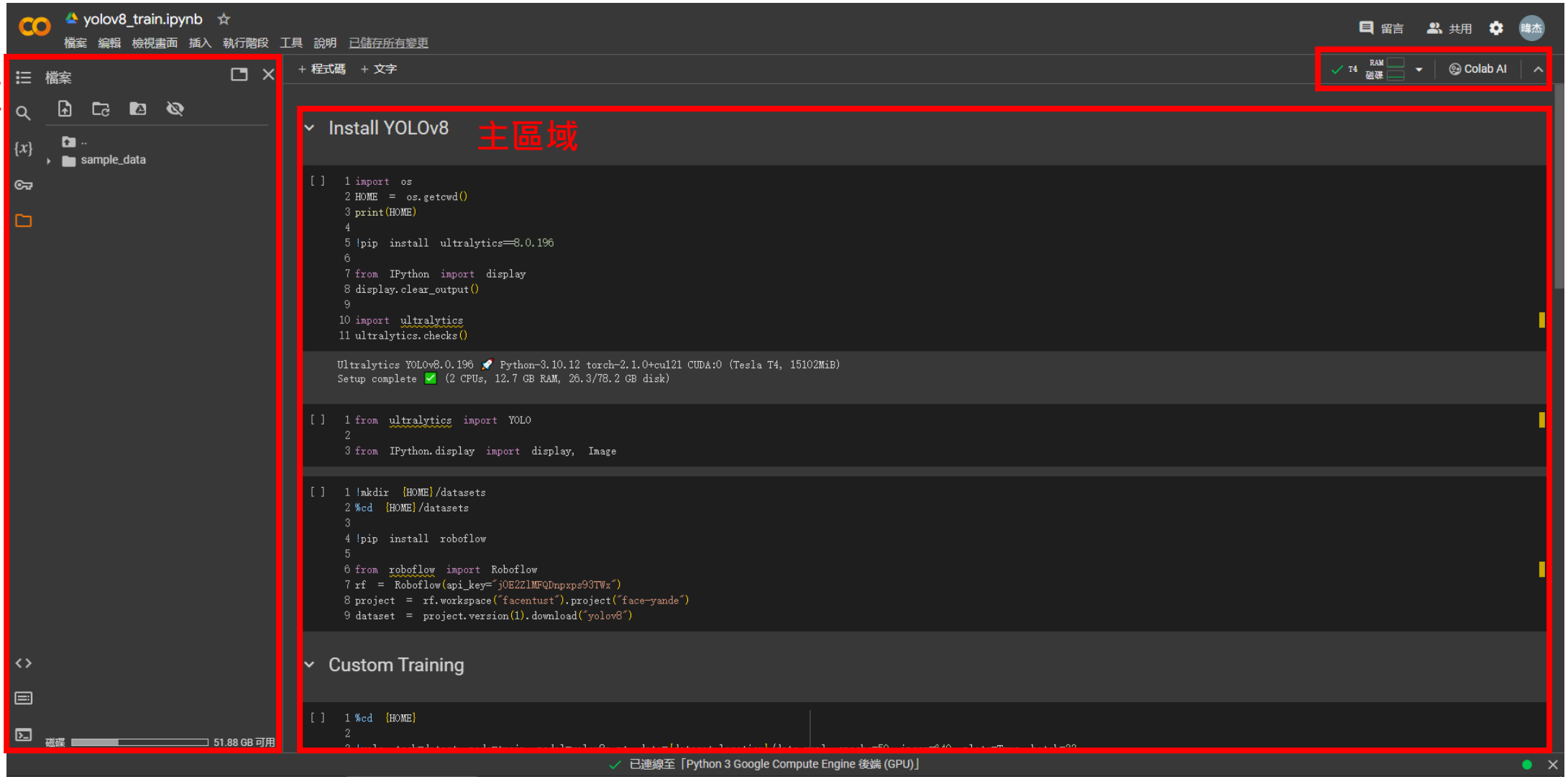
```yaml
train: ../train/images
val: ../valid/images


nc: 1
names: ['face']
```

data.yaml

YOLOv8

Google Colaboratory(Colab)

YOLOv8


yolov8_train.ipynb
檔案 編輯 檢視畫面 插入 執行階段 工具 說明 已儲存所有變更
留言
共用
暐杰
目錄區
檔案
sample_data
磁碟
51.88 GB 可用
+ 程式碼
+ 文字
T4
RAM
磁碟
Colab AI
主機資源
Install YOLOv8
主區域
[ ] 1 import os
2 HOME = os.getcwd()
3 print(HOME)
4
5 !pip install ultralytics==8.0.196
6
7 from IPython import display
8 display.clear_output()
9
10 import ultralytics
11 ultralytics.checks()
Ultralytics YOLOv8.0.196 🚀 Python-3.10.12 torch-2.1.0+cu121 CUDA:0 (Tesla T4, 15102MiB)
Setup complete ✅ (2 CPUs, 12.7 GB RAM, 26.3/78.2 GB disk)
[ ] 1 from ultralytics import YOLO
2
3 from IPython.display import display, Image
[ ] 1 !mkdir {HOME}/datasets
2 %cd {HOME}/datasets
3
4 !pip install roboflow
5
6 from roboflow import Roboflow
7 rf = Roboflow(api_key="j0E2ZlMFQDnpxps93TWx")
8 project = rf.workspace("facentust").project("face-yande")
9 dataset = project.version(1).download("yolov8")
Custom Training
[ ] 1 %cd {HOME}
2
已連線至「Python 3 Google Compute Engine 後端 (GPU)」

YOLOv8

```
import os
HOME = os.getcwd()
print(HOME)

!pip install ultralytics==8.0.196

from IPython import display
display.clear_output()

import ultralytics
ultralytics.checks()
```

```
from ultralytics import YOLO

from IPython.display import display, Image
```

```
!mkdir {HOME}/datasets
%cd {HOME}/datasets
```

替換成你的roboflow 資料集

```
!pip install roboflow

from roboflow import Roboflow
rf = Roboflow(api_key="jOE2ZlMFQDnpxps93TWx")
project = rf.workspace("facentust").project("face-yande")
dataset = project.version(1).download("yolov8")
```

YOLOv8

```
%cd  {HOME}

!yolo  task=detect  mode=train  model=yolov8n.pt  data={dataset.location}/data.yaml  epochs=50  imgsz=640  plots=True  batch=32
```

detect
segment
classify
pose
obb

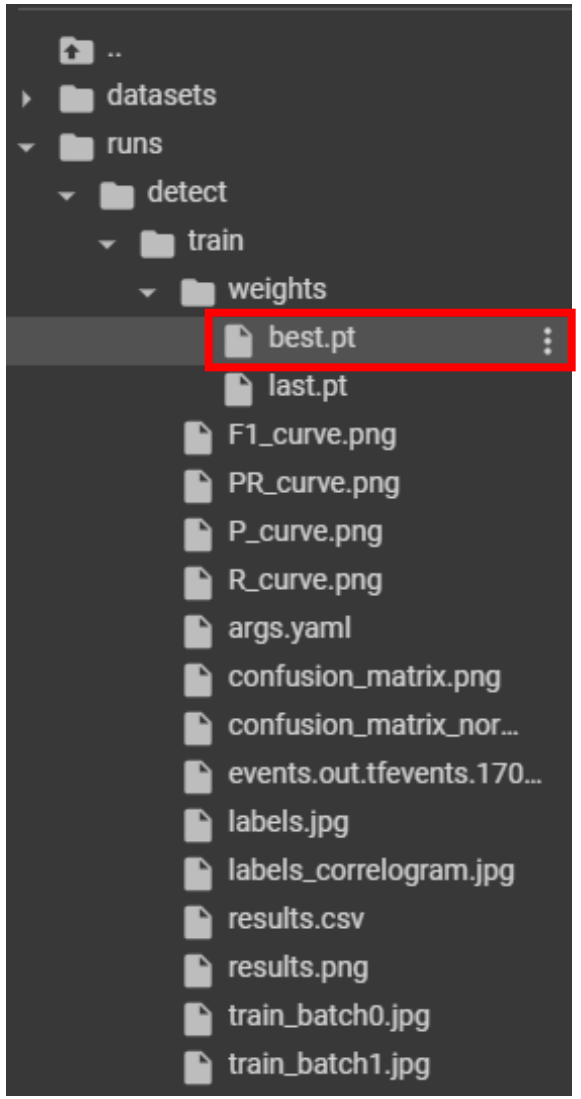
train
val
predict
export
track

v8n
v8s
v8m
v8l
v8x

訓練次數

批次數量

YOLOv8



載下來用於推論

YOLOv8

Inference:

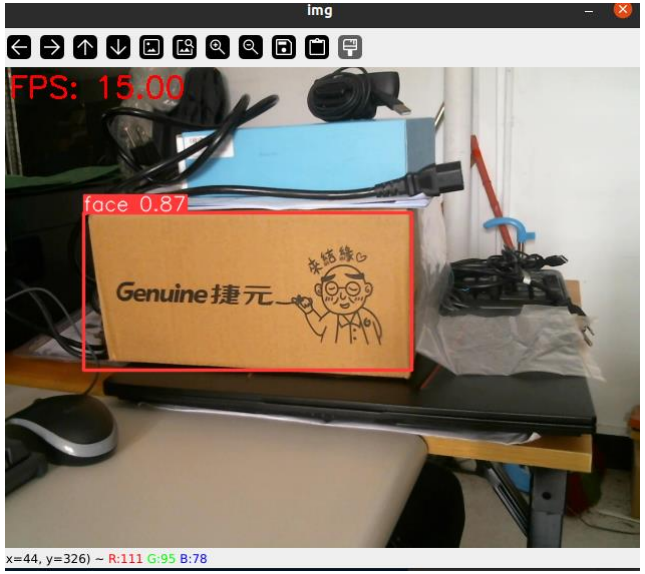
yolo detect predict model=path/to/best.pt source="https://ultralytics.com/images/bus.jpg"--save

```python
from ultralytics import YOLO

# Load a model
model = YOLO("path/to/best.pt")  # load a custom model

# Predict with the model
results = model.predict(source="https://ultralytics.com/images/bus.jpg",save=True)  # predict on an image
```

YOLOv8人臉辨識

請訓練自己的dataset
1.先透過USB_cam錄影或拍照(寫程式or OBS錄製or手機拍照)
2.上傳roboflow後進行標註
3.開始訓練
4.用相機進行即時的物件偵測
5.使用TensorRT進行加速推論

✔



✘

目標

1.FPS大於30(yolov8n)、13(yolov8m)、6(yolov8x)

2.不可辨識錯人臉

報告形式：
將程式碼與詳細註解以文字形式或圖片貼入 Word 檔，連同執行結果截圖，並加入心得報告，轉成PDF 檔。
檔案名稱以 HW3_學號命名，例如 HW3_M11201234.pdf。
將程式碼與PDF打包成zip上傳至 Moodle 2 作業區。