

```
Invidia-smi
```

```
/bin/bash: line 1: nvidia-smi: command not found
```

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

```
/content
```

## ✓ Install YOLOv8

YOLOv8 is still under heavy development. Breaking changes are being introduced almost weekly. We strive to make our YOLOv8 notebooks work with the latest version of the library. Last tests took place on 18.01.2023 with version YOLOv8.0.9.

If you notice that our notebook behaves incorrectly - especially if you experience errors that prevent you from going through the tutorial - don't hesitate! Let us know and open an issue on the Roboflow Notebooks repository.

YOLOv8 can be installed in two ways-from the source and via pip. This is because it is the first iteration of YOLO to have an official package.

```
# Pip install method (recommended)
```

```
!pip install ultralytics==8.0.20
```

```
from IPython import display
display.clear_output()
```

```
import ultralytics
ultralytics.checks()
```

```
Ultralytics YOLOv8.0.20 Python-3.10.12 torch-2.3.0+cu121 CPU
Setup complete (2 CPUs, 12.7 GB RAM, 30.2/107.7 GB disk)
```

```
from ultralytics import YOLO
```

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

## ✓ Custom Training

```
from google.colab import drive
drive.mount('/content/drive')
```

```
Mounted at /content/drive
```

```
%cd /content/drive/MyDrive/Classess
```

```
/content/drive/MyDrive/Classess
```

```
lls
```

```
data.yaml 'St_George Detection.v1i.yolov5pytorch' YoloV5.ipynb
```

```
%cd /content/drive/MyDrive/Classess
```

```
!yolo task=detect mode=train model=yolov8s.pt data= data.yaml epochs=35 imgsz=224 plots=True
```

```
/content/drive/MyDrive/Classess
Downloading https://github.com/ultralytics/assets/releases/download/v0.0.0/yolov8s.pt...
100% 21.5M/21.5M [00:00<00:00, 106MB/s]
```

```
Ultralytics YOLOv8.0.20 Python-3.10.12 torch-2.3.0+cu121 CPU
```

```
yolo/engine/trainer: task=detect, mode=train, model=yolov8s.yaml, data=data.yaml, epochs=35, patience=50, batch=16, imgsz=224, sa
Downloading https://ultralytics.com/assets/Arial.ttf to /root/.config/Ultralytics/Arial.ttf...
```

```
100% 755k/755k [00:00<00:00, 20.1MB/s]
```

```
2024-06-30 10:58:07.020882: E external/local_xla/xla/stream_executor/cuda/cuda_dnn.cc:9261] Unable to register cuDNN factory: Att
```

```
2024-06-30 10:58:07.020971: E external/local_xla/xla/stream_executor/cuda/cuda_fft.cc:607] Unable to register cuFFT factory: Atte
```

```
2024-06-30 10:58:07.174267: E external/local_xla/xla/stream_executor/cuda/cuda_blas.cc:1515] Unable to register cuBLAS factory: A
```

```
2024-06-30 10:58:07.477751: I tensorflow/core/platform/cpu_feature_guard.cc:182] This TensorFlow binary is optimized to use avail
```

```
To enable the following instructions: AVX2 FMA, in other operations, rebuild TensorFlow with the appropriate compiler flags.
```

```
2024-06-30 10:58:10.426974: W tensorflow/compiler/tf2tensorrt/utils/py_utils.cc:38] TF-TRT Warning: Could not find TensorRT
```

```
Overriding model.yaml nc=80 with nc=1
```

	from	n	params	module	arguments
0	-1	1	928	ultralytics.nn.modules.Conv	[3, 32, 3, 2]

```

1      -1 1      18560 ultralytics.nn.modules.Conv      [32, 64, 3, 2]
2      -1 1      29056 ultralytics.nn.modules.C2f      [64, 64, 1, True]
3      -1 1      73984 ultralytics.nn.modules.Conv      [64, 128, 3, 2]
4      -1 2      197632 ultralytics.nn.modules.C2f      [128, 128, 2, True]
5      -1 1      295424 ultralytics.nn.modules.Conv      [128, 256, 3, 2]
6      -1 2      788480 ultralytics.nn.modules.C2f      [256, 256, 2, True]
7      -1 1      1180672 ultralytics.nn.modules.Conv      [256, 512, 3, 2]
8      -1 1      1838080 ultralytics.nn.modules.C2f      [512, 512, 1, True]
9      -1 1      656896 ultralytics.nn.modules.SPPF      [512, 512, 5]
10     -1 1      0 torch.nn.modules.upsampling.Upsample      [None, 2, 'nearest']
11     [-1, 6] 1      0 ultralytics.nn.modules.Concat      [1]
12     -1 1      591360 ultralytics.nn.modules.C2f      [768, 256, 1]
13     -1 1      0 torch.nn.modules.upsampling.Upsample      [None, 2, 'nearest']
14     [-1, 4] 1      0 ultralytics.nn.modules.Concat      [1]
15     -1 1      148224 ultralytics.nn.modules.C2f      [384, 128, 1]
16     -1 1      147712 ultralytics.nn.modules.Conv      [128, 128, 3, 2]
17     [-1, 12] 1      0 ultralytics.nn.modules.Concat      [1]
18     -1 1      493056 ultralytics.nn.modules.C2f      [384, 256, 1]
19     -1 1      590336 ultralytics.nn.modules.Conv      [256, 256, 3, 2]
20     [-1, 9] 1      0 ultralytics.nn.modules.Concat      [1]
21     -1 1      1969152 ultralytics.nn.modules.C2f      [768, 512, 1]
22     [15, 18, 21] 1      2116435 ultralytics.nn.modules.Detect      [1, [128, 256, 512]]
Model summary: 225 layers, 11135987 parameters, 11135971 gradients, 28.6 GFLOPs

```

Transferred 349/355 items from pretrained weights

**optimizer:** SGD(lr=0.01) with parameter groups 57 weight(decay=0.0), 64 weight(decay=0.001), 63 bias

**train:** Scanning /content/drive/MyDrive/Classess/St\_George Detection.v1i.yolov5pytorch/train/labels... 50 images, 0 backgrounds, 0

**train:** New cache created: /content/drive/MyDrive/Classess/St\_George Detection.v1i.yolov5pytorch/train/labels.cache

**augmentations:** Blur(p=0.01, blur\_limit=(3, 7)), MedianBlur(p=0.01, blur\_limit=(3, 7)), ToGray(p=0.01), CLAHE(p=0.01, clip\_limit=

**val:** Scanning /content/drive/MyDrive/Classess/St\_George Detection.v1i.yolov5pytorch/valid/labels... 25 images, 0 backgrounds, 0 c

**val:** New cache created: /content/drive/MyDrive/Classess/St\_George Detection.v1i.yolov5pytorch/valid/labels.cache

Image sizes 224 train, 224 val

Using 0 dataloader workers

Logging results to runs/detect/train

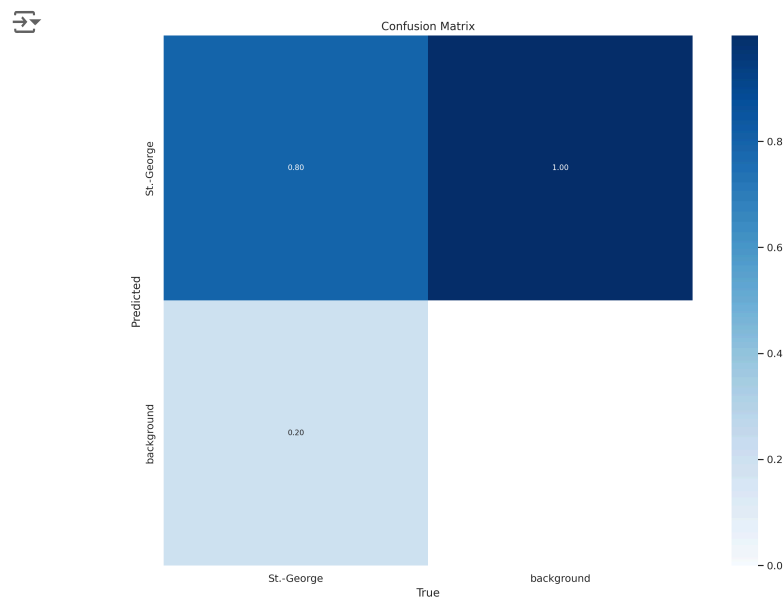
Starting training for 35 epochs...

Epoch	GPU_mem	box_loss	cls_loss	dfl_loss	Instances	Size
1/35	0G	2.793	3.926	2.293	4	224: 100% 4/4 [00:20<00:00, 5.06s/it]

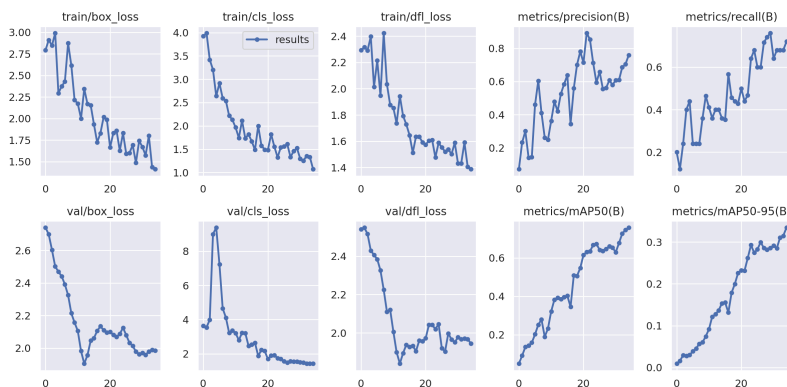
!ls runs/detect/train/

args.yaml	R_curve.png	train_batch102.jpg
confusion_matrix.png	results.csv	train_batch1.jpg
events.out.tfevents.1719745094.3743a229a3ca.9484.0	results.png	train_batch2.jpg
F1_curve.png	train_batch0.jpg	val_batch0_labels.jpg
P_curve.png	train_batch100.jpg	val_batch0_pred.jpg
PR_curve.png	train_batch101.jpg	weights

Image(filename='runs/detect/train/confusion\_matrix.png', width=600)



Image(filename='runs/detect/train/results.png', width=600)



Image(filename='runs/detect/train/val\_batch0\_pred.jpg', width=600)



## ✓ Validate Custom Model (validation data)

```
!yolo task=detect mode=val model=runs/detect/train/weights/best.pt data=data.yaml
```



```
2024-06-30 11:17:38.074574: E external/local_xla/xla/stream_executor/cuda/cuda_dnn.cc:9261] Unable to register cuDNN factory: Attempt
2024-06-30 11:17:38.074635: E external/local_xla/xla/stream_executor/cuda/cuda_fft.cc:607] Unable to register cuFFT factory: Attempt
2024-06-30 11:17:38.076457: E external/local_xla/xla/stream_executor/cuda/cuda_blas.cc:1515] Unable to register cuBLAS factory: Atte
2024-06-30 11:17:38.085616: I tensorflow/core/platform/cpu_feature_guard.cc:182] This TensorFlow binary is optimized to use availabl
To enable the following instructions: AVX2 FMA, in other operations, rebuild TensorFlow with the appropriate compiler flags.
2024-06-30 11:17:40.725083: W tensorflow/compiler/tf2tensorrt/utils/py_utils.cc:38] TF-TRT Warning: Could not find TensorRT
Ultralytics YOLOv8.0.20 Python-3.10.12 torch-2.3.0+cu121 CPU
Model summary (fused): 168 layers, 11125971 parameters, 0 gradients, 28.4 GFLOPs
val: Scanning /content/drive/MyDrive/Classess/St-George Detection.v1i.yolov5pytorch/valid/labels.cache... 25 images, 0 backgrounds,
Class Images Instances Box(P R mAP50 mAP50-95): 100% 2/2 [00:03<00:00, 1.93s/it]
all 25 25 0.758 0.72 0.758 0.333
Speed: 1.9ms pre-process, 112.1ms inference, 0.0ms loss, 0.5ms post-process per image
```

## ✓ Inference with Custom Model (test data)

```
!yolo task=detect mode=predict model='runs/detect/train/weights/best.pt' conf=0.25 source='St_George Detection.v1i.yolov5pytorch/test/in
```



```
2024-06-30 11:21:50.134360: E external/local_xla/xla/stream_executor/cuda/cuda_dnn.cc:9261] Unable to register cuDNN factory: Attempt
2024-06-30 11:21:50.134424: E external/local_xla/xla/stream_executor/cuda/cuda_fft.cc:607] Unable to register cuFFT factory: Attempt
2024-06-30 11:21:50.136685: E external/local_xla/xla/stream_executor/cuda/cuda_blas.cc:1515] Unable to register cuBLAS factory: Atte
2024-06-30 11:21:50.148766: I tensorflow/core/platform/cpu_feature_guard.cc:182] This TensorFlow binary is optimized to use availabl
```

To enable the following instructions: AVX2 FMA, in other operations, rebuild TensorFlow with the appropriate compiler flags.  
 2024-06-30 11:21:51.881631: W tensorflow/compiler/tf2tensorrt/rt\_utils/py\_utils.cc:38] TF-TRT Warning: Could not find TensorRT  
 Ultralytics YOLOv8.0.20 Python-3.10.12 torch-2.3.0+cu121 CPU

Model summary (fused): 168 layers, 11125971 parameters, 0 gradients, 28.4 GFLOPs

image 1/16 /content/drive/MyDrive/Classess/St\_George Detection.v1i.yolov5pytorch/test/images/061388adae665ed34ca3b60515bd7d39.jpg.r  
 image 2/16 /content/drive/MyDrive/Classess/St\_George Detection.v1i.yolov5pytorch/test/images/0835c6853d2049cbb0d69ef918792bde.jpg.r  
 image 3/16 /content/drive/MyDrive/Classess/St\_George Detection.v1i.yolov5pytorch/test/images/0a716f6f14eea3adc30e0944a7123759.jpg.r  
 image 4/16 /content/drive/MyDrive/Classess/St\_George Detection.v1i.yolov5pytorch/test/images/2426a367ff3a485de6bdf9eeb2ca8e0.jpg.r  
 image 5/16 /content/drive/MyDrive/Classess/St\_George Detection.v1i.yolov5pytorch/test/images/2d1100c7959a8477876d21a76bb23ef0.jpg.r  
 image 6/16 /content/drive/MyDrive/Classess/St\_George Detection.v1i.yolov5pytorch/test/images/3c89bcd20d55cb8591b5c6b15395dafd.jpg.r  
 image 7/16 /content/drive/MyDrive/Classess/St\_George Detection.v1i.yolov5pytorch/test/images/421e63c7aede91f24e1c25629535d937.jpg.r  
 image 8/16 /content/drive/MyDrive/Classess/St\_George Detection.v1i.yolov5pytorch/test/images/5162545590f31ebc1a309ced57540b19.jpg.r  
 image 9/16 /content/drive/MyDrive/Classess/St\_George Detection.v1i.yolov5pytorch/test/images/76295130cced2bb54ffdd770bd08a386.jpg.r  
 image 10/16 /content/drive/MyDrive/Classess/St\_George Detection.v1i.yolov5pytorch/test/images/88fb883aaa20a859e8b460a9104bf783.jpg.r  
 image 11/16 /content/drive/MyDrive/Classess/St\_George Detection.v1i.yolov5pytorch/test/images/a0889aa8e2d52dd64781a16c3fa95781.jpg.r  
 image 12/16 /content/drive/MyDrive/Classess/St\_George Detection.v1i.yolov5pytorch/test/images/ad0d4f2cb3216176ec9912914213d324.jpg.r  
 image 13/16 /content/drive/MyDrive/Classess/St\_George Detection.v1i.yolov5pytorch/test/images/bd7b3bf19024c7c5965063324d5a298a.jpg.r  
 image 14/16 /content/drive/MyDrive/Classess/St\_George Detection.v1i.yolov5pytorch/test/images/ea5a7e87c3c0eafc960c3ca1cccfe035.jpg.r  
 image 15/16 /content/drive/MyDrive/Classess/St\_George Detection.v1i.yolov5pytorch/test/images/f3dd3201859ff67b986c4fe681788db5.jpg.r  
 image 16/16 /content/drive/MyDrive/Classess/St\_George Detection.v1i.yolov5pytorch/test/images/fd7828963b0693168669274c51a5cb05.jpg.r  
 Speed: 0.3ms pre-process, 105.2ms inference, 1.0ms postprocess per image at shape (1, 3, 224, 224)

```
import glob
from IPython.display import Image, display

for image_path in glob.glob('runs/detect/predict/*.jpg')[3:]:
    display(Image(filename=image_path, width=600))
    print("\n")
```

## ✎ Identifying presense of ST. Georgie in an image (Image Url)

```

import torch
from ultralytics import YOLO
from PIL import Image as PILImage, ImageDraw
import requests
from io import BytesIO
import matplotlib.pyplot as plt

# Load the trained model
model = YOLO('runs/detect/train/weights/best.pt')

# Function to classify image based on the presence of St George
def classify_image(image_url):
    # Download the image from the URL
    response = requests.get(image_url)
    image = PILImage.open(BytesIO(response.content))

    # Run inference
    results = model(image)

    # Extract predictions
    predictions = results[0].boxes.data # predictions for the first image

    # Check for presence of "St George"
    class_names = model.names # Get class names
    st_george_present = False

    # Draw the bounding boxes
    draw = ImageDraw.Draw(image)

    for prediction in predictions:
        # Extract the bounding box coordinates and class id
        x1, y1, x2, y2, conf, class_id = prediction
        class_id = int(class_id) # class_id is the last element
        class_name = class_names[class_id]

        # Draw the bounding box and label
        draw.rectangle([x1, y1, x2, y2], outline='red', width=3)
        draw.text((x1, y1), f'{class_name} {conf:.2f}', fill='red')



        if class_name == 'St George':
            st_george_present = True

    # Display the result
    if st_george_present:
        print("St George is present in the image.")
    else:
        print("St George is not present in the image.")

    # Display the image with detections
    plt.imshow(image)
    plt.axis('off')
    plt.show()

# Example usage
image_url = 'https://i.pinimg.com/736x/78/63/a2/7863a2404af5741f6d9fdb2e4ffad02.jpg' # Replace with the URL of your image
classify_image(image_url)

```

 Ultralytics YOLOv8.0.20  Python-3.10.12 torch-2.3.0+cu121 CPU  
 Model summary (fused): 168 layers, 11125971 parameters, 0 gradients, 28.4 GFLOPs  
 St George is not present in the image.



## ▼ Identifying presense of ST. Georgie in an image (Image Path)

```
# import torch
# from ultralytics import YOLO
# from PIL import Image as PILImage
# import matplotlib.pyplot as plt

# # Load the trained model
# model = YOLO('runs/detect/train/weights/best.pt')

# # Function to classify image based on the presence of St George
# def classify_image(image_path):
#     # Load and preprocess the image
#     image = PILImage.open(image_path)

#     # Run inference
#     results = model(image)

#     # Extract predictions
#     predictions = results.pred[0] # predictions for the first image

#     # Check for presence of "St George"
#     class_names = model.names # Get class names
#     st_george_present = False

#     for prediction in predictions:
#         class_id = int(prediction[5]) # class_id is the 6th element
#         class_name = class_names[class_id]
#         if class_name == 'St George':
#             st_george_present = True
#             break

#     # Display the result
#     if st_george_present:
#         print("St George is present in the image.")
#     else:
#         print("St George is not present in the image.")

#     # Display the image with detections
#     results.show()
#     plt.imshow(image)
#     plt.axis('off')
#     plt.show()

# # Example usage
# image_path = 'path/to/your/image.jpg' # Replace with the path to your image
# classify_image(image_path)
```

## Summarization :

- As we have received huge almost 2000 image datets of st Geore, so We only collected 91 images of St. George and mannualy annotated bounding boxes with coordinates, width and height with the help of Roboflow. (Because its not possible to annotated 2k images mannualy alone with limited time).