```
!pip install ultralytics
!pip install opencv-python
!pip install torch torchvision torchaudio
```

```
    Found existing installation: nvidia-cuda-runtime-cu12 12.5.82
    Uninstalling nvidia-cuda-runtime-cu12-12.5.82:
      Successfully uninstalled nvidia-cuda-runtime-cu12-12.5.82
  Attempting uninstall: nvidia-cuda-nvrtc-cu12
    Found existing installation: nvidia-cuda-nvrtc-cu12 12.5.82
    Uninstalling nvidia-cuda-nvrtc-cu12-12.5.82:
      Successfully uninstalled nvidia-cuda-nvrtc-cu12-12.5.82
  Attempting uninstall: nvidia-cuda-cupti-cu12
    Found existing installation: nvidia-cuda-cupti-cu12 12.5.82
    Uninstalling nvidia-cuda-cupti-cu12-12.5.82:
      Successfully uninstalled nvidia-cuda-cupti-cu12-12.5.82
  Attempting uninstall: nvidia-cublas-cu12
    Found existing installation: nvidia-cublas-cu12 12.5.3.2
    Uninstalling nvidia-cublas-cu12-12.5.3.2:
      Successfully uninstalled nvidia-cublas-cu12-12.5.3.2
  Attempting uninstall: nvidia-cusparse-cu12
    Found existing installation: nvidia-cusparse-cu12 12.5.1.3
    Uninstalling nvidia-cusparse-cu12-12.5.1.3:
      Successfully uninstalled nvidia-cusparse-cu12-12.5.1.3
  Attempting uninstall: nvidia-cudnn-cu12
    Found existing installation: nvidia-cudnn-cu12 9.3.0.75
    Uninstalling nvidia-cudnn-cu12-9.3.0.75:
      Successfully uninstalled nvidia-cudnn-cu12-9.3.0.75
  Attempting uninstall: nvidia-cusolver-cu12
    Found existing installation: nvidia-cusolver-cu12 11.6.3.83
    Uninstalling nvidia-cusolver-cu12-11.6.3.83:
      Successfully uninstalled nvidia-cusolver-cu12-11.6.3.83
Successfully installed nvidia-cublas-cu12-12.4.5.8 nvidia-cuda-cupti-cu12-12.4.127 nvidia-cuda-nvrtc
Requirement already satisfied: opencv-python in /usr/local/lib/python3.11/dist-packages (4.11.0.86)
Requirement already satisfied: numpy>=1.21.2 in /usr/local/lib/python3.11/dist-packages (from opencv
Requirement already satisfied: torch in /usr/local/lib/python3.11/dist-packages (2.6.0+cu124)
Requirement already satisfied: torchvision in /usr/local/lib/python3.11/dist-packages (0.21.0+cu124)
Requirement already satisfied: torchaudio in /usr/local/lib/python3.11/dist-packages (2.6.0+cu124)
Requirement already satisfied: filelock in /usr/local/lib/python3.11/dist-packages (from torch) (3.1
Requirement already satisfied: typing-extensions>=4.10.0 in /usr/local/lib/python3.11/dist-packages
Requirement already satisfied: networkx in /usr/local/lib/python3.11/dist-packages (from torch) (3.4
Requirement already satisfied: jinja2 in /usr/local/lib/python3.11/dist-packages (from torch) (3.1.6
Requirement already satisfied: fsspec in /usr/local/lib/python3.11/dist-packages (from torch) (2025.
Requirement already satisfied: nvidia-cuda-nvrtc-cu12==12.4.127 in /usr/local/lib/python3.11/dist-pa
Requirement already satisfied: nvidia-cuda-runtime-cu12==12.4.127 in /usr/local/lib/python3.11/dist-
Requirement already satisfied: nvidia-cuda-cupti-cu12==12.4.127 in /usr/local/lib/python3.11/dist-pa
Requirement already satisfied: nvidia-cudnn-cu12==9.1.0.70 in /usr/local/lib/python3.11/dist-package
Requirement already satisfied: nvidia-cublas-cu12==12.4.5.8 in /usr/local/lib/python3.11/dist-packag
Requirement already satisfied: nvidia-cufft-cu12==11.2.1.3 in /usr/local/lib/python3.11/dist-package
Requirement already satisfied: nvidia-curand-cu12==10.3.5.147 in /usr/local/lib/python3.11/dist-pack
Requirement already satisfied: nvidia-cusolver-cu12==11.6.1.9 in /usr/local/lib/python3.11/dist-pack
Requirement already satisfied: nvidia-cusparse-cu12==12.3.1.170 in /usr/local/lib/python3.11/dist-pa
Requirement already satisfied: nvidia-cusparselt-cu12==0.6.2 in /usr/local/lib/python3.11/dist-packa
Requirement already satisfied: nvidia-nccl-cu12==2.21.5 in /usr/local/lib/python3.11/dist-packages (
Requirement already satisfied: nvidia-nvtx-cu12==12.4.127 in /usr/local/lib/python3.11/dist-packages
Requirement already satisfied: nvidia-nvjitlink-cu12==12.4.127 in /usr/local/lib/python3.11/dist-pac
Requirement already satisfied: triton==3.2.0 in /usr/local/lib/python3.11/dist-packages (from torch)
Requirement already satisfied: sympy==1.13.1 in /usr/local/lib/python3.11/dist-packages (from torch)
Requirement already satisfied: mpmath<1.4,>=1.1.0 in /usr/local/lib/python3.11/dist-packages (from s
Requirement already satisfied: numpy in /usr/local/lib/python3.11/dist-packages (from torchvision) (
Requirement already satisfied: pillow!=8.3.*,>=5.3.0 in /usr/local/lib/python3.11/dist-packages (fro
Requirement already satisfied: MarkupSafe>=2.0 in /usr/local/lib/python3.11/dist-packages (from jinj
```

```
!apt-get install unrar
import os

rar_path = "/content/Night1.rar"  # Change this to your uploaded file path
extract_path = "/content/dataset"
```

```
# Create extraction directory
os.makedirs(extract_path, exist_ok=True)

# Extract dataset
!unrar x -o+ "{rar_path}" "{extract_path}"

# Verify extraction
os.listdir(extract_path)
```

```
Extracting  /content/dataset/Night1/val/labels/422.txt                OK
Extracting  /content/dataset/Night1/val/labels/423.txt                OK
Extracting  /content/dataset/Night1/val/labels/424.txt                OK
Extracting  /content/dataset/Night1/val/labels/425.txt                OK
Extracting  /content/dataset/Night1/val/labels/426.txt                OK
Extracting  /content/dataset/Night1/val/labels/427.txt                OK
Extracting  /content/dataset/Night1/val/labels/428.txt                OK
Extracting  /content/dataset/Night1/val/labels/429.txt                OK
Extracting  /content/dataset/Night1/val/labels/430.txt                OK
Extracting  /content/dataset/Night1/val/labels/4580.txt               OK
Extracting  /content/dataset/Night1/val/labels/4581.txt               OK
Extracting  /content/dataset/Night1/val/labels/4582.txt               OK
Extracting  /content/dataset/Night1/val/labels/4583.txt               OK
Extracting  /content/dataset/Night1/val/labels/4584.txt               OK
Extracting  /content/dataset/Night1/val/labels/4585.txt               OK
Extracting  /content/dataset/Night1/val/labels/4586.txt               OK
Extracting  /content/dataset/Night1/val/labels/4587.txt               OK
Extracting  /content/dataset/Night1/val/labels/4588.txt               OK
Extracting  /content/dataset/Night1/val/labels/4589.txt               OK
Extracting  /content/dataset/Night1/val/labels/4590.txt               OK
Extracting  /content/dataset/Night1/val/labels/4591.txt               OK
Extracting  /content/dataset/Night1/val/labels/4592.txt               OK
Extracting  /content/dataset/Night1/val/labels/4593.txt               OK
Extracting  /content/dataset/Night1/val/labels/4594.txt               OK
Extracting  /content/dataset/Night1/val/labels/4595.txt               OK
Extracting  /content/dataset/Night1/val/labels/4596.txt               OK
Extracting  /content/dataset/Night1/val/labels/4597.txt               OK
Extracting  /content/dataset/Night1/val/labels/4598.txt               OK
Extracting  /content/dataset/Night1/val/labels/4599.txt               OK
Extracting  /content/dataset/Night1/val/labels/900.txt                OK
Extracting  /content/dataset/Night1/val/labels/901.txt                OK
Extracting  /content/dataset/Night1/val/labels/902.txt                OK
Extracting  /content/dataset/Night1/val/labels/903.txt                OK
Extracting  /content/dataset/Night1/val/labels/904.txt                OK
Extracting  /content/dataset/Night1/val/labels/905.txt                OK
Extracting  /content/dataset/Night1/val/labels/906.txt                OK
Extracting  /content/dataset/Night1/val/labels/907.txt                OK
Extracting  /content/dataset/Night1/val/labels/908.txt                OK
Extracting  /content/dataset/Night1/val/labels/909.txt                OK
Extracting  /content/dataset/Night1/val/labels/910.txt                OK
Extracting  /content/dataset/Night1/val/labels/911.txt                OK
Extracting  /content/dataset/Night1/val/labels/912.txt                OK
Extracting  /content/dataset/Night1/val/labels/913.txt                OK
Extracting  /content/dataset/Night1/val/labels/914.txt                OK
Extracting  /content/dataset/Night1/val/labels/915.txt                OK
Extracting  /content/dataset/Night1/val/labels/916.txt                OK
Extracting  /content/dataset/Night1/val/labels/917.txt                OK
Extracting  /content/dataset/Night1/val/labels/918.txt                OK
Extracting  /content/dataset/Night1/val/labels/919.txt                OK
Extracting  /content/dataset/Night1/val/labels/920.txt                OK
Extracting  /content/dataset/Night1/val/labels/921.txt                OK
Extracting  /content/dataset/Night1/val/labels/922.txt                OK
Extracting  /content/dataset/Night1/val/labels/923.txt                OK
Extracting  /content/dataset/Night1/val/labels/924.txt                OK
Extracting  /content/dataset/Night1/val/labels/925.txt                OK
Extracting  /content/dataset/Night1/val/labels/926.txt                OK
All OK
['Night1']
```

```
data_yaml = """
path: /content/dataset/Night1  # Root dataset path
```

```
train: /content/dataset/Night1/train/images  # Training images
val: /content/dataset/Night1/val/images  # Validation images

nc: 10  # Number of classes (Change this based on your dataset)
names: [
"Stop", "No pedestrian crossing", "No parking", "Parking", "Give way", "One way", "No left turn", "Speed li
]
"""

with open("/content/dataset/data.yaml", "w") as file:
    file.write(data_yaml)


from ultralytics import YOLO

# Load YOLOv11 model (or latest YOLO version)
model = YOLO("/content/yolo11m.pt")  # Change to actual config if necessary

# Train model
model.train(
    data="/content/dataset/data.yaml",
    epochs=50,
    imgsz=640,
    batch=16,
    device="cuda"
)
```

```
fitness: np.float64(0.8431919057280195)
keys: ['metrics/precision(B)', 'metrics/recall(B)', 'metrics/mAP50(B)', 'metrics/mAP50-95(B)']
maps: array([    0.94119,     0.97927,     0.95115,     0.90475,     0.98486,     0.70596,
0.59362,     0.77115,      0.7795,     0.67931])
names: {0: 'Stop', 1: 'No pedestrian crossing', 2: 'No parking', 3: 'Parking', 4: 'Give way', 5:
'One way', 6: 'No left turn', 7: 'Speed limit', 8: 'Bus lane', 9: 'Pedestrian crossing'}
plot: True
results_dict: {'metrics/precision(B)': np.float64(0.9200448642532819), 'metrics/recall(B)':
np.float64(0.9439591993400148), 'metrics/mAP50(B)': np.float64(0.9702344649690808), 'metrics/mAP50-
95(B)': np.float64(0.829076065812346), 'fitness': np.float64(0.8431919057280195)}
save_dir: PosixPath('runs/detect/train')
speed: {'preprocess': 0.18919575799181942, 'inference': 7.624536707765953, 'loss':
0.0003863470285326098, 'postprocess': 2.259242488588779}
task: 'detect'
```

```
results = model.val()
```

```
Ultralytics 8.3.96 🚀 Python-3.11.11 torch-2.6.0+cu124 CUDA:0 (Tesla T4, 15095MiB)
YOLO11m summary (fused): 125 layers, 20,037,742 parameters, 0 gradients, 67.7 GFLOPs
val: Scanning /content/dataset/Night1/val/labels.cache... 219 images, 0 backgrounds, 0 corrupt: 100%|██
                 Class     Images  Instances      Box(P          R      mAP50  mAP50-95): 100%|███████
                   all        219        288      0.921      0.946      0.971      0.828
                  Stop         32         41      0.967      0.976      0.994      0.937
No pedestrian crossing         27         27      0.876          1      0.994      0.979
            No parking         20         20      0.895       0.95      0.984      0.945
               Parking         21         25      0.888       0.95      0.957      0.905
             Give way         20         21      0.969          1      0.995      0.985
              One way         45         70      0.913      0.957      0.977      0.697
          No left turn         19         22      0.822      0.838       0.91      0.599
           Speed limit         21         21          1      0.897       0.98      0.772
              Bus lane         20         20       0.98          1      0.995      0.775
   Pedestrian crossing         19         21      0.904      0.897       0.92      0.685
Speed: 0.5ms preprocess, 15.5ms inference, 0.0ms loss, 1.7ms postprocess per image
Results saved to runs/detect/train2
```

```
import cv2
import matplotlib.pyplot as plt

# Load the trained model
model = YOLO("/content/runs/detect/train/weights/best.pt")  # Update path to best model

# Path to test image
image_path = "/content/dataset/Night1/val/images/914.jpg"  # Change to your image path

# Run inference
results = model(image_path)

# Display results
for r in results:
    im_array = r.plot()  # Plot results
    im = cv2.cvtColor(im_array, cv2.COLOR_BGR2RGB)
    plt.imshow(im)
    plt.axis("off")
    plt.show()
```

```
image 1/1 /content/dataset/Night1/val/images/914.jpg: 448x640 1 No pedestrian crossing, 48.5ms
Speed: 3.3ms preprocess, 48.5ms inference, 1.4ms postprocess per image at shape (1, 3, 448, 640)
```