```
%pip install ultralytics
```

```
Downloading ultralytics-8.3.162-py3-none-any.whl (1.0 MB)
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Downloading nvidia_cudnn_cu12-9.1.0.70-py3-none-manylinux2014_x86_64.whl (664.8 MB)
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Downloading nvidia_cufft_cu12-11.2.1.3-py3-none-manylinux2014_x86_64.whl (211.5 MB)
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Downloading nvidia_curand_cu12-10.3.5.147-py3-none-manylinux2014_x86_64.whl (56.3 MB)
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Downloading nvidia_cusolver_cu12-11.6.1.9-py3-none-manylinux2014_x86_64.whl (127.9 MB)
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Downloading nvidia_cusparse_cu12-12.3.1.170-py3-none-manylinux2014_x86_64.whl (207.5 MB)
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Downloading nvidia_nvjitlink_cu12-12.4.127-py3-none-manylinux2014_x86_64.whl (21.1 MB)
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Downloading ultralytics_thop-2.0.14-py3-none-any.whl (26 kB)
Installing collected packages: nvidia-nvjitlink-cu12, nvidia-curand-cu12, nvidia-cufft-cu12, nvidia-cuda-runtime-cu12, nvidia-cuda
  Attempting uninstall: nvidia-nvjitlink-cu12
    Found existing installation: nvidia-nvjitlink-cu12 12.5.82
    Uninstalling nvidia-nvjitlink-cu12-12.5.82:
      Successfully uninstalled nvidia-nvjitlink-cu12-12.5.82
  Attempting uninstall: nvidia-curand-cu12
    Found existing installation: nvidia-curand-cu12 10.3.6.82
    Uninstalling nvidia-curand-cu12-10.3.6.82:
      Successfully uninstalled nvidia-curand-cu12-10.3.6.82
  Attempting uninstall: nvidia-cufft-cu12
    Found existing installation: nvidia-cufft-cu12 11.2.3.61
    Uninstalling nvidia-cufft-cu12-11.2.3.61:
      Successfully uninstalled nvidia-cufft-cu12-11.2.3.61
  Attempting uninstall: nvidia-cuda-runtime-cu12
    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
```

```
# Montar Google Drive
print("Montando Google Drive...")
drive.mount('/content/drive')
print("Google Drive montado.")
```

```
# Instalar/Actualizar Ultralytics
print("\nInstalando/Actualizando Ultralytics a la última versión para soporte YOLOv11...")
%pip install -U ultralytics
print("Ultralytics instalado/actualizado.")
```

```
from google.colab import drive
import os
import torch
import time
from ultralytics import YOLO
```

```
# Verificar disponibilidad de GPU
print("\nVerificando disponibilidad de GPU...")
device_to_use = "0" if torch.cuda.is_available() else "cpu"
```

```
print(f"Usando dispositivo: {device_to_use}")

# Definir rutas del dataset y modelo
data_yaml_path = "/content/drive/MyDrive/Colab Notebooks/LSECNumYoloII/dataset/data - colab.yaml"
project_directory = "/content/drive/MyDrive/Colab Notebooks/LSECNumYoloII/runs"
run_name = "yolo11_1"

# Lista de modelos a intentar en orden de preferencia
initial_model_preferences = ['yolov11s.pt', 'yolov8s.pt']
checkpoint_path = os.path.join(project_directory, "detect", run_name, "weights", "last.pt")

# Cargar modelo con lógica de prioridades
print(f"\nBuscando modelo entre: {initial_model_preferences}")
model = None

if os.path.exists(checkpoint_path):
    print(f"Cargando desde checkpoint: {checkpoint_path}")
    try:
        model = YOLO(checkpoint_path)
    except Exception as e:
        print(f"Error al cargar checkpoint: {e}")

if model is None:
    for preferred_model in initial_model_preferences:
        try:
            model = YOLO(preferred_model)
            print(f"Modelo {preferred_model} cargado exitosamente.")
            break
        except Exception as e:
            print(f"Error al cargar {preferred_model}: {e}")

if model is None:
    print("Error crítico: No se pudo cargar ningún modelo.")
    exit()

# Definir hiperparámetros
optimizer = "sgd"
lr0 = 0.005
lrf = 0.1
momentum = 0.937

# Entrenar el modelo
print("\nIniciando entrenamiento del modelo...")
results = model.train(data=data_yaml_path, epochs=100, optimizer=optimizer, lr0=lr0, lrf=lrf,momentum=momentum, cos_lr=True, imgsz=640,

print("\nEntrenamiento completado! Resultados guardados en:")
print(os.path.join(project_directory, "detect", run_name))
```

```
Validating runs/detect/yolo11_14/weights/best.pt...
Ultralytics 8.3.155 🚀 Python-3.11.13 torch-2.6.0+cu124 CUDA:0 (Tesla T4, 15095MiB)
Model summary (fused): 72 layers, 11,129,841 parameters, 0 gradients, 28.5 GFLOPs
                 Class     Images  Instances      Box(P          R      mAP50  mAP50-95): 100%|██████████| 7/7 [00:01<00:00,  3.74
                   all         99         99      0.927      0.906      0.957      0.867
                clase0         12         12      0.993      0.667      0.873      0.692
                clase1          7          7      0.766          1      0.871      0.757
                clase2         10         10      0.902      0.922      0.986       0.91
                clase3         15         15      0.993        0.8      0.905      0.887
                clase4         11         11      0.916          1      0.995      0.975
                clase5          7          7      0.864      0.912      0.978       0.93
                clase6          9          9      0.892      0.922       0.94      0.877
                clase7          3          3      0.923          1      0.995       0.93
                clase8          9          9          1      0.738      0.995      0.946
                clase9          7          7      0.969          1      0.995      0.927
               clase10          9          9      0.979          1      0.995      0.705
Speed: 0.5ms preprocess, 4.9ms inference, 0.0ms loss, 4.1ms postprocess per image
Results saved to runs/detect/yolo11_14

Entrenamiento completado! Resultados guardados en:
/content/drive/MyDrive/Colab Notebooks/LSECNumYoloII/runs/detect/volo11 1
```

Empieza a programar o a crear código con IA.