INCS870-Yolo.ipynb

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```
import os
import locale

# Manually set the environment variables
os.environ["LC_ALL"] = "C.UTF-8"
os.environ["LANG"] = "C.UTF-8"
locale.setlocale(locale.LC_ALL, "C.UTF-8")

# Try using subprocess instead of !pip
import subprocess
subprocess.run(["pip", "install", "ultralytics"])


--NORMAL--
```

```
CompletedProcess(args=['pip', 'install', 'ultralytics'], returncode=0)
```

```
!locale
```

```
LANG=C.UTF-8
LANGUAGE=en_US
LC_CTYPE="C.UTF-8"
LC_NUMERIC="C.UTF-8"
LC_TIME="C.UTF-8"
LC_COLLATE="C.UTF-8"
LC_MONETARY="C.UTF-8"
LC_MESSAGES="C.UTF-8"
LC_PAPER="C.UTF-8"
LC_NAME="C.UTF-8"
LC_ADDRESS="C.UTF-8"
LC_TELEPHONE="C.UTF-8"
LC_MEASUREMENT="C.UTF-8"
LC_IDENTIFICATION="C.UTF-8"
LC_ALL=C.UTF-8
```

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

```
Drive already mounted at /content/drive; to attempt to forcibly remount, call drive.mount("/content/drive", force_remount=True).
```

```
# Install YOLOv8
!pip install ultralytics



# Import YOLO and Mount Google Drive
from ultralytics import YOLO
from google.colab import drive

# Mount Google Drive (Required to access your dataset)
drive.mount('/content/drive')

# Copy Dataset from Google Drive to Colab
!cp -r "/content/drive/MyDrive/Colab Notebooks/yolo_dataset" /content/

# Define YOLO Training Config
dataset_path = "/content/yolo_dataset"  # Dataset path in Colab
data_yaml = f"{dataset_path}/data.yaml"  # Path to data.yaml

# Load YOLOv8 Model
model = YOLO("yolov8n.pt")  # Using YOLOv8 Nano (Fast & Lightweight)

# Train YOLOv8 Model
model.train(
    data=data_yaml,
    epochs=50,        # Adjust based on dataset size
    imgsz=640,        # Image size (640 recommended for speed)
    batch=16,         # Batch size
    workers=2,        # Use 2 CPU workers for loading data
    project="YOLOv8-Training",  # Save results under this folder
    name="home_security_model",  # Model name
    exist_ok=True     # Overwrite previous runs
)

# Save Trained Model to Google Drive
!cp -r /content/YOLOv8-Training/home_security_model /content/drive/MyDrive/Colab Notebooks/
```

```
      Epoch    GPU_mem   box_loss   cls_loss   dfl_loss  Instances       Size
      43/50      2.95G     0.4364     0.2513     0.9238         11        640: 100%|██████████| 59/59 [00:14<00:00,  3.96it/s]
                 Class     Images  Instances      Box(P          R      mAP50  mAP50-95): 100%|██████████| 5/5 [00:01<00:00,  4.06it/s]
                   all        148        148      0.971      0.991      0.993      0.843

      Epoch    GPU_mem   box_loss   cls_loss   dfl_loss  Instances       Size
      44/50      2.96G     0.4322      0.248     0.9153         11        640: 100%|██████████| 59/59 [00:14<00:00,  3.95it/s]
                 Class     Images  Instances      Box(P          R      mAP50  mAP50-95): 100%|██████████| 5/5 [00:01<00:00,  4.22it/s]
                   all        148        148      0.973       0.99      0.991      0.825

      Epoch    GPU_mem   box_loss   cls_loss   dfl_loss  Instances       Size
      45/50      2.98G     0.4239     0.2378     0.9168         11        640: 100%|██████████| 59/59 [00:15<00:00,  3.89it/s]
                 Class     Images  Instances      Box(P          R      mAP50  mAP50-95): 100%|██████████| 5/5 [00:01<00:00,  4.40it/s]
                   all        148        148      0.965          1      0.989      0.834

      Epoch    GPU_mem   box_loss   cls_loss   dfl_loss  Instances       Size
      46/50        3G     0.4121     0.2378     0.9041         11        640: 100%|██████████| 59/59 [00:14<00:00,  3.95it/s]
                 Class     Images  Instances      Box(P          R      mAP50  mAP50-95): 100%|██████████| 5/5 [00:01<00:00,  4.20it/s]
                   all        148        148      0.969      0.989       0.99      0.828

      Epoch    GPU_mem   box_loss   cls_loss   dfl_loss  Instances       Size
      47/50      3.01G     0.4152     0.2318     0.9066         11        640: 100%|██████████| 59/59 [00:15<00:00,  3.91it/s]
                 Class     Images  Instances      Box(P          R      mAP50  mAP50-95): 100%|██████████| 5/5 [00:02<00:00,  2.36it/s]
                   all        148        148       0.97          1      0.988      0.833

      Epoch    GPU_mem   box_loss   cls_loss   dfl_loss  Instances       Size
      48/50      3.03G     0.4005     0.2212     0.8989         11        640: 100%|██████████| 59/59 [00:14<00:00,  4.01it/s]
                 Class     Images  Instances      Box(P          R      mAP50  mAP50-95): 100%|██████████| 5/5 [00:01<00:00,  2.96it/s]
                   all        148        148      0.955      0.997      0.987      0.825

      Epoch    GPU_mem   box_loss   cls_loss   dfl_loss  Instances       Size
      49/50      3.05G     0.3999     0.2187     0.8969         11        640: 100%|██████████| 59/59 [00:14<00:00,  3.94it/s]
                 Class     Images  Instances      Box(P          R      mAP50  mAP50-95): 100%|██████████| 5/5 [00:01<00:00,  4.02it/s]
                   all        148        148      0.964      0.999       0.99      0.839

      Epoch    GPU_mem   box_loss   cls_loss   dfl_loss  Instances       Size
      50/50      3.07G     0.3926     0.2169     0.8991         11        640: 100%|██████████| 59/59 [00:15<00:00,  3.93it/s]
                 Class     Images  Instances      Box(P          R      mAP50  mAP50-95): 100%|██████████| 5/5 [00:01<00:00,  4.40it/s]
                   all        148        148      0.961          1      0.991      0.839

50 epochs completed in 0.247 hours.
Optimizer stripped from YOLOv8-Training/home_security_model/weights/last.pt, 6.2MB
Optimizer stripped from YOLOv8-Training/home_security_model/weights/best.pt, 6.2MB

Validating YOLOv8-Training/home_security_model/weights/best.pt...
Ultralytics 8.3.115 🚀 Python-3.11.12 torch-2.6.0+cu124 CUDA:0 (Tesla T4, 15095MiB)
Model summary (fused): 72 layers, 3,006,623 parameters, 0 gradients, 8.1 GFLOPs
                 Class     Images  Instances      Box(P          R      mAP50  mAP50-95): 100%|██████████| 5/5 [00:02<00:00,  2.25it/s]
```

```
                   all        148        148      0.988      0.991      0.994      0.845
                   box         32         32      0.992          1      0.995      0.884
                   gun         45         45       0.98      0.956      0.992      0.759
                  face         26         26       0.99          1      0.995      0.854
      face_half_covered         19         19      0.987          1      0.995      0.798
     face_fully_covered         26         26       0.99          1      0.995       0.93
Speed: 0.2ms preprocess, 2.0ms inference, 0.0ms loss, 5.2ms postprocess per image
Results saved to YOLOv8-Training/home_security_model
cp: target 'Notebooks/' is not a directory
```

Copy trained model to drive

```
[ ]
import shutil

src = "/content/YOLOv8-Training/home_security_model"
dst = "/content/drive/MyDrive/Colab Notebooks/"

shutil.copytree(src, dst, dirs_exist_ok=True)  # copies model files
print("✅ Model saved to Google Drive successfully!")
```

```
✅ Model saved to Google Drive successfully!
```

Manual test trained model

```
[ ]
# ✅ 1️⃣ Install YOLOv8
!pip install ultralytics

from ultralytics import YOLO

# Mount Google Drive (Required to access your dataset)
from google.colab import drive
drive.mount('/content/drive')

# ✅ 3️⃣ Copy Dataset from Google Drive to Colab
!cp -r "/content/drive/MyDrive/Colab Notebooks/yolo_dataset" /content/

# Load trained model
model = YOLO("/content/drive/MyDrive/Colab Notebooks/yolo_weights/best.pt")

# Run inference on a test image
results = model.predict("/content/drive/MyDrive/Colab Notebooks/yolo_dataset/images/val/face_half_covered_0164.jpg", save=True)

# Display results
from PIL import Image
Image.open("/content/runs/detect/predict/face_half_covered_0164.jpg")
```

```
Requirement already satisfied: certifi>=2017.4.17 in /usr/local/lib/python3.11/dist-packages (from requests>=2.23.0->ultralytics) (2025.1.31)
Requirement already satisfied: filelock in /usr/local/lib/python3.11/dist-packages (from torch>=1.8.0->ultralytics) (3.18.0)
Requirement already satisfied: typing-extensions>=4.10.0 in /usr/local/lib/python3.11/dist-packages (from torch>=1.8.0->ultralytics) (4.13.2)
Requirement already satisfied: networkx in /usr/local/lib/python3.11/dist-packages (from torch>=1.8.0->ultralytics) (3.4.2)
Requirement already satisfied: jinja2 in /usr/local/lib/python3.11/dist-packages (from torch>=1.8.0->ultralytics) (3.1.6)
Requirement already satisfied: fsspec in /usr/local/lib/python3.11/dist-packages (from torch>=1.8.0->ultralytics) (2025.3.2)
Requirement already satisfied: nvidia-cuda-nvrtc-cu12==12.4.127 in /usr/local/lib/python3.11/dist-packages (from torch>=1.8.0->ultralytics) (12.4.127)
Requirement already satisfied: nvidia-cuda-runtime-cu12==12.4.127 in /usr/local/lib/python3.11/dist-packages (from torch>=1.8.0->ultralytics) (12.4.127)
Requirement already satisfied: nvidia-cuda-cupti-cu12==12.4.127 in /usr/local/lib/python3.11/dist-packages (from torch>=1.8.0->ultralytics) (12.4.127)
Requirement already satisfied: nvidia-cudnn-cu12==9.1.0.70 in /usr/local/lib/python3.11/dist-packages (from torch>=1.8.0->ultralytics) (9.1.0.70)
Requirement already satisfied: nvidia-cublas-cu12==12.4.5.8 in /usr/local/lib/python3.11/dist-packages (from torch>=1.8.0->ultralytics) (12.4.5.8)
Requirement already satisfied: nvidia-cufft-cu12==11.2.1.3 in /usr/local/lib/python3.11/dist-packages (from torch>=1.8.0->ultralytics) (11.2.1.3)
Requirement already satisfied: nvidia-curand-cu12==10.3.5.147 in /usr/local/lib/python3.11/dist-packages (from torch>=1.8.0->ultralytics) (10.3.5.147)
Requirement already satisfied: nvidia-cusolver-cu12==11.6.1.9 in /usr/local/lib/python3.11/dist-packages (from torch>=1.8.0->ultralytics) (11.6.1.9)
Requirement already satisfied: nvidia-cusparse-cu12==12.3.1.170 in /usr/local/lib/python3.11/dist-packages (from torch>=1.8.0->ultralytics) (12.3.1.170)
Requirement already satisfied: nvidia-cusparselt-cu12==0.6.2 in /usr/local/lib/python3.11/dist-packages (from torch>=1.8.0->ultralytics) (0.6.2)
Requirement already satisfied: nvidia-nccl-cu12==2.21.5 in /usr/local/lib/python3.11/dist-packages (from torch>=1.8.0->ultralytics) (2.21.5)
Requirement already satisfied: nvidia-nvtx-cu12==12.4.127 in /usr/local/lib/python3.11/dist-packages (from torch>=1.8.0->ultralytics) (12.4.127)
Requirement already satisfied: nvidia-nvjitlink-cu12==12.4.127 in /usr/local/lib/python3.11/dist-packages (from torch>=1.8.0->ultralytics) (12.4.127)
Requirement already satisfied: triton==3.2.0 in /usr/local/lib/python3.11/dist-packages (from torch>=1.8.0->ultralytics) (3.2.0)
Requirement already satisfied: sympy==1.13.1 in /usr/local/lib/python3.11/dist-packages (from torch>=1.8.0->ultralytics) (1.13.1)
Requirement already satisfied: mpmath<1.4,>=1.1.0 in /usr/local/lib/python3.11/dist-packages (from sympy==1.13.1->torch>=1.8.0->ultralytics) (1.3.0)
Requirement already satisfied: six>=1.5 in /usr/local/lib/python3.11/dist-packages (from python-dateutil>=2.7->matplotlib>=3.3.0->ultralytics) (1.17.0)
Requirement already satisfied: MarkupSafe>=2.0 in /usr/local/lib/python3.11/dist-packages (from jinja2->torch>=1.8.0->ultralytics) (3.0.2)
Drive already mounted at /content/drive; to attempt to forcibly remount, call drive.mount("/content/drive", force_remount=True).

image 1/1 /content/drive/MyDrive/Colab Notebooks/dataset/images/val/face_half_covered_0164.jpg: 480x640 1 face_half_covered, 38.3ms
Speed: 2.0ms preprocess, 38.3ms inference, 1.6ms postprocess per image at shape (1, 3, 480, 640)
Results saved to runs/detect/predict
```