```
!pip install roboflow
```

```
Collecting roboflow
  Downloading roboflow-1.2.0-py3-none-any.whl.metadata (9.7 kB)
Requirement already satisfied: certifi in
/usr/local/lib/python3.11/dist-packages (from roboflow) (2025.6.15)
Collecting idna==3.7 (from roboflow)
  Downloading idna-3.7-py3-none-any.whl.metadata (9.9 kB)
Requirement already satisfied: cycler in
/usr/local/lib/python3.11/dist-packages (from roboflow) (0.12.1)
Requirement already satisfied: kiwisolver>=1.3.1 in
/usr/local/lib/python3.11/dist-packages (from roboflow) (1.4.8)
Requirement already satisfied: matplotlib in
/usr/local/lib/python3.11/dist-packages (from roboflow) (3.10.0)
Requirement already satisfied: numpy>=1.18.5 in
/usr/local/lib/python3.11/dist-packages (from roboflow) (2.0.2)
Collecting opencv-python-headless==4.10.0.84 (from roboflow)
  Downloading opencv_python_headless-4.10.0.84-cp37-abi3-
manylinux_2_17_x86_64.manylinux2014_x86_64.whl.metadata (20 kB)
Requirement already satisfied: Pillow>=7.1.2 in
/usr/local/lib/python3.11/dist-packages (from roboflow) (11.2.1)
Collecting pillow-heif<2 (from roboflow)
  Downloading pillow_heif-1.0.0-cp311-cp311-
manylinux_2_17_x86_64.manylinux2014_x86_64.whl.metadata (9.6 kB)
Collecting pillow-avif-plugin<2 (from roboflow)
  Downloading pillow_avif_plugin-1.5.2-cp311-cp311-
manylinux_2_28_x86_64.whl.metadata (2.1 kB)
Requirement already satisfied: python-dateutil in
/usr/local/lib/python3.11/dist-packages (from roboflow) (2.9.0.post0)
Collecting python-dotenv (from roboflow)
  Downloading python_dotenv-1.1.1-py3-none-any.whl.metadata (24 kB)
Requirement already satisfied: requests in
/usr/local/lib/python3.11/dist-packages (from roboflow) (2.32.3)
Requirement already satisfied: six in /usr/local/lib/python3.11/dist-
packages (from roboflow) (1.17.0)
Requirement already satisfied: urllib3>=1.26.6 in
/usr/local/lib/python3.11/dist-packages (from roboflow) (2.4.0)
Requirement already satisfied: tqdm>=4.41.0 in
/usr/local/lib/python3.11/dist-packages (from roboflow) (4.67.1)
Requirement already satisfied: PyYAML>=5.3.1 in
/usr/local/lib/python3.11/dist-packages (from roboflow) (6.0.2)
Requirement already satisfied: requests-toolbelt in
/usr/local/lib/python3.11/dist-packages (from roboflow) (1.0.0)
Collecting filetype (from roboflow)
  Downloading filetype-1.2.0-py2.py3-none-any.whl.metadata (6.5 kB)
Requirement already satisfied: contourpy>=1.0.1 in
/usr/local/lib/python3.11/dist-packages (from matplotlib->roboflow)
(1.3.2)
Requirement already satisfied: fonttools>=4.22.0 in
/usr/local/lib/python3.11/dist-packages (from matplotlib->roboflow)
```

```
(4.58.4)
Requirement already satisfied: packaging>=20.0 in
/usr/local/lib/python3.11/dist-packages (from matplotlib->roboflow)
(24.2)
Requirement already satisfied: pyparsing>=2.3.1 in
/usr/local/lib/python3.11/dist-packages (from matplotlib->roboflow)
(3.2.3)
Requirement already satisfied: charset-normalizer<4,>=2 in
/usr/local/lib/python3.11/dist-packages (from requests->roboflow)
(3.4.2)
Downloading roboflow-1.2.0-py3-none-any.whl (86 kB)
━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━ 86.8/86.8 kB 4.2 MB/s eta
0:00:00
━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━ 66.8/66.8 kB 6.3 MB/s eta
0:00:00
anylinux_2_17_x86_64.manylinux2014_x86_64.whl (49.9 MB)
━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━ 49.9/49.9 MB 44.8 MB/s eta
0:00:00
anylinux_2_28_x86_64.whl (4.2 MB)
━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━ 4.2/4.2 MB 117.0 MB/s eta
0:00:00
anylinux_2_17_x86_64.manylinux2014_x86_64.whl (4.9 MB)
━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━ 4.9/4.9 MB 125.0 MB/s eta
0:00:00
pting uninstall: opencv-python-headless
    Found existing installation: opencv-python-headless 4.11.0.86
    Uninstalling opencv-python-headless-4.11.0.86:
      Successfully uninstalled opencv-python-headless-4.11.0.86
  Attempting uninstall: idna
    Found existing installation: idna 3.10
    Uninstalling idna-3.10:
      Successfully uninstalled idna-3.10
Successfully installed filetype-1.2.0 idna-3.7 opencv-python-headless-
4.10.0.84 pillow-avif-plugin-1.5.2 pillow-heif-1.0.0 python-dotenv-
1.1.1 roboflow-1.2.0
```

```
!pip install ultralytics
```

```
Collecting ultralytics
  Downloading ultralytics-8.3.161-py3-none-any.whl.metadata (37 kB)
Requirement already satisfied: numpy>=1.23.0 in
/usr/local/lib/python3.11/dist-packages (from ultralytics) (2.0.2)
Requirement already satisfied: matplotlib>=3.3.0 in
/usr/local/lib/python3.11/dist-packages (from ultralytics) (3.10.0)
Requirement already satisfied: opencv-python>=4.6.0 in
/usr/local/lib/python3.11/dist-packages (from ultralytics) (4.11.0.86)
Requirement already satisfied: pillow>=7.1.2 in
/usr/local/lib/python3.11/dist-packages (from ultralytics) (11.2.1)
Requirement already satisfied: pyyaml>=5.3.1 in
/usr/local/lib/python3.11/dist-packages (from ultralytics) (6.0.2)
```

```
Requirement already satisfied: requests>=2.23.0 in
/usr/local/lib/python3.11/dist-packages (from ultralytics) (2.32.3)
Requirement already satisfied: scipy>=1.4.1 in
/usr/local/lib/python3.11/dist-packages (from ultralytics) (1.15.3)
Requirement already satisfied: torch>=1.8.0 in
/usr/local/lib/python3.11/dist-packages (from ultralytics)
(2.6.0+cu124)
Requirement already satisfied: torchvision>=0.9.0 in
/usr/local/lib/python3.11/dist-packages (from ultralytics)
(0.21.0+cu124)
Requirement already satisfied: tqdm>=4.64.0 in
/usr/local/lib/python3.11/dist-packages (from ultralytics) (4.67.1)
Requirement already satisfied: psutil in
/usr/local/lib/python3.11/dist-packages (from ultralytics) (5.9.5)
Requirement already satisfied: py-cpuinfo in
/usr/local/lib/python3.11/dist-packages (from ultralytics) (9.0.0)
Requirement already satisfied: pandas>=1.1.4 in
/usr/local/lib/python3.11/dist-packages (from ultralytics) (2.2.2)
Collecting ultralytics-thop>=2.0.0 (from ultralytics)
  Downloading ultralytics_thop-2.0.14-py3-none-any.whl.metadata (9.4
kB)
Requirement already satisfied: contourpy>=1.0.1 in
/usr/local/lib/python3.11/dist-packages (from matplotlib>=3.3.0-
>ultralytics) (1.3.2)
Requirement already satisfied: cycler>=0.10 in
/usr/local/lib/python3.11/dist-packages (from matplotlib>=3.3.0-
>ultralytics) (0.12.1)
Requirement already satisfied: fonttools>=4.22.0 in
/usr/local/lib/python3.11/dist-packages (from matplotlib>=3.3.0-
>ultralytics) (4.58.4)
Requirement already satisfied: kiwisolver>=1.3.1 in
/usr/local/lib/python3.11/dist-packages (from matplotlib>=3.3.0-
>ultralytics) (1.4.8)
Requirement already satisfied: packaging>=20.0 in
/usr/local/lib/python3.11/dist-packages (from matplotlib>=3.3.0-
>ultralytics) (24.2)
Requirement already satisfied: pyparsing>=2.3.1 in
/usr/local/lib/python3.11/dist-packages (from matplotlib>=3.3.0-
>ultralytics) (3.2.3)
Requirement already satisfied: python-dateutil>=2.7 in
/usr/local/lib/python3.11/dist-packages (from matplotlib>=3.3.0-
>ultralytics) (2.9.0.post0)
Requirement already satisfied: pytz>=2020.1 in
/usr/local/lib/python3.11/dist-packages (from pandas>=1.1.4-
>ultralytics) (2025.2)
Requirement already satisfied: tzdata>=2022.7 in
/usr/local/lib/python3.11/dist-packages (from pandas>=1.1.4-
>ultralytics) (2025.2)
Requirement already satisfied: charset-normalizer<4,>=2 in
```

```
/usr/local/lib/python3.11/dist-packages (from requests>=2.23.0-
>ultralytics) (3.4.2)
Requirement already satisfied: idna<4,>=2.5 in
/usr/local/lib/python3.11/dist-packages (from requests>=2.23.0-
>ultralytics) (3.7)
Requirement already satisfied: urllib3<3,>=1.21.1 in
/usr/local/lib/python3.11/dist-packages (from requests>=2.23.0-
>ultralytics) (2.4.0)
Requirement already satisfied: certifi>=2017.4.17 in
/usr/local/lib/python3.11/dist-packages (from requests>=2.23.0-
>ultralytics) (2025.6.15)
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) (4.14.0)
Requirement already satisfied: networkx in
/usr/local/lib/python3.11/dist-packages (from torch>=1.8.0-
>ultralytics) (3.5)
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)
Collecting nvidia-cuda-nvrtc-cu12==12.4.127 (from torch>=1.8.0-
>ultralytics)
  Downloading nvidia_cuda_nvrtc_cu12-12.4.127-py3-none-
manylinux2014_x86_64.whl.metadata (1.5 kB)
Collecting nvidia-cuda-runtime-cu12==12.4.127 (from torch>=1.8.0-
>ultralytics)
  Downloading nvidia_cuda_runtime_cu12-12.4.127-py3-none-
manylinux2014_x86_64.whl.metadata (1.5 kB)
Collecting nvidia-cuda-cupti-cu12==12.4.127 (from torch>=1.8.0-
>ultralytics)
  Downloading nvidia_cuda_cupti_cu12-12.4.127-py3-none-
manylinux2014_x86_64.whl.metadata (1.6 kB)
Collecting nvidia-cudnn-cu12==9.1.0.70 (from torch>=1.8.0-
>ultralytics)
  Downloading nvidia_cudnn_cu12-9.1.0.70-py3-none-
manylinux2014_x86_64.whl.metadata (1.6 kB)
Collecting nvidia-cublas-cu12==12.4.5.8 (from torch>=1.8.0-
>ultralytics)
  Downloading nvidia_cublas_cu12-12.4.5.8-py3-none-
manylinux2014_x86_64.whl.metadata (1.5 kB)
Collecting nvidia-cufft-cu12==11.2.1.3 (from torch>=1.8.0-
>ultralytics)
  Downloading nvidia_cufft_cu12-11.2.1.3-py3-none-
```

```
manylinux2014_x86_64.whl.metadata (1.5 kB)
Collecting nvidia-curand-cu12==10.3.5.147 (from torch>=1.8.0-
>ultralytics)
  Downloading nvidia_curand_cu12-10.3.5.147-py3-none-
manylinux2014_x86_64.whl.metadata (1.5 kB)
Collecting nvidia-cusolver-cu12==11.6.1.9 (from torch>=1.8.0-
>ultralytics)
  Downloading nvidia_cusolver_cu12-11.6.1.9-py3-none-
manylinux2014_x86_64.whl.metadata (1.6 kB)
Collecting nvidia-cusparse-cu12==12.3.1.170 (from torch>=1.8.0-
>ultralytics)
  Downloading nvidia_cusparse_cu12-12.3.1.170-py3-none-
manylinux2014_x86_64.whl.metadata (1.6 kB)
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)
Collecting nvidia-nvjitlink-cu12==12.4.127 (from torch>=1.8.0-
>ultralytics)
  Downloading nvidia_nvjitlink_cu12-12.4.127-py3-none-
manylinux2014_x86_64.whl.metadata (1.5 kB)
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)
Downloading ultralytics-8.3.161-py3-none-any.whl (1.0 MB)
━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━ 1.0/1.0 MB 20.4 MB/s eta
0:00:00
anylinux2014_x86_64.whl (363.4 MB)
━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━ 363.4/363.4 MB 2.1 MB/s eta
0:00:00
anylinux2014_x86_64.whl (13.8 MB)
━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━ 13.8/13.8 MB 127.2 MB/s eta
```

```
0:00:00
anylinux2014_x86_64.whl (24.6 MB)
━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━ 24.6/24.6 MB 89.8 MB/s eta
0:00:00
e_cu12-12.4.127-py3-none-manylinux2014_x86_64.whl (883 kB)
━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━ 883.7/883.7 kB 59.9 MB/s eta
0:00:00
anylinux2014_x86_64.whl (664.8 MB)
━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━ 664.8/664.8 MB 1.3 MB/s eta
0:00:00
anylinux2014_x86_64.whl (211.5 MB)
━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━ 211.5/211.5 MB 9.7 MB/s eta
0:00:00
anylinux2014_x86_64.whl (56.3 MB)
━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━ 56.3/56.3 MB 37.4 MB/s eta
0:00:00
anylinux2014_x86_64.whl (127.9 MB)
━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━ 127.9/127.9 MB 16.5 MB/s eta
0:00:00
anylinux2014_x86_64.whl (207.5 MB)
━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━ 207.5/207.5 MB 2.7 MB/s eta
0:00:00
anylinux2014_x86_64.whl (21.1 MB)
━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━ 21.1/21.1 MB 100.1 MB/s eta
0:00:00
e-cu12, nvidia-cuda-nvrtc-cu12, nvidia-cuda-cupti-cu12, nvidia-cublas-
cu12, nvidia-cusparse-cu12, nvidia-cudnn-cu12, nvidia-cusolver-cu12,
ultralytics-thop, ultralytics
  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
  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-cu12-12.4.127 nvidia-cuda-runtime-
cu12-12.4.127 nvidia-cudnn-cu12-9.1.0.70 nvidia-cufft-cu12-11.2.1.3
nvidia-curand-cu12-10.3.5.147 nvidia-cusolver-cu12-11.6.1.9 nvidia-
cusparse-cu12-12.3.1.170 nvidia-nvjitlink-cu12-12.4.127 ultralytics-
8.3.161 ultralytics-thop-2.0.14
```

```
from roboflow import Roboflow

from ultralytics import YOLO
import torch
```

```
Creating new Ultralytics Settings v0.0.6 file □
View Ultralytics Settings with 'yolo settings' or at
'/root/.config/Ultralytics/settings.json'
Update Settings with 'yolo settings key=value', i.e. 'yolo settings
runs_dir=path/to/dir'. For help see
https://docs.ultralytics.com/quickstart/#ultralytics-settings.
```

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

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

```
import os
import yaml
```

Dangerous Model Training

```
rf = Roboflow(api_key="wLBN5d9AgXyh35mEwYPW")
project = rf.workspace("xray-object-detection").project("x-ray-cargo-object-detection")
version = project.version(6)
dataset = version.download("yolov8")
```

```
loading Roboflow workspace...
loading Roboflow project...
```

```
Downloading Dataset Version Zip in X-ray-cargo-object-detection-6 to yolov8:: 100%|██████████| 67299/67299 [00:00<00:00, 81737.62it/s]
```

```
Extracting Dataset Version Zip to X-ray-cargo-object-detection-6 in yolov8:: 100%|██████████| 3702/3702 [00:00<00:00, 8615.17it/s]
```

```
def main():
    device = 'cuda' if torch.cuda.is_available() else 'cpu'
    print(f"Dangerous Model Training will run on: {device}")

    # ?  1. load da pre trained YOLOv8 model.
    print("Loading pre-trained YOLOv8 model...")
    model = YOLO('yolov8n.pt')

    # ? 2. training
    print("Starting model fine-tuning process...")
    results =
model.train(data='X-ray-cargo-object-detection-6/data.yaml',
epochs=35, imgsz=640)

    print("\n============================================================")
    print("TRAINING COMPLETED!")
    print(f"Best model saved in folder: {results.save_dir}")
    print("Model file to be used for API is 'best.pt'")
    print("============================================================")


if __name__ == '__main__':
    main()
```

```
Dangerous Model Training will run on: cuda
Loading pre-trained YOLOv8 model...
Downloading https://github.com/ultralytics/assets/releases/download/v8.3.0/yolov8n.pt to 'yolov8n.pt'...

100%|██████████| 6.25M/6.25M [00:00<00:00, 71.2MB/s]
```

```
Starting model fine-tuning process...
Ultralytics 8.3.161 🚀 Python-3.11.13 torch-2.6.0+cu124 CUDA:0 (NVIDIA
A100-SXM4-40GB, 40507MiB)
engine/trainer: agnostic_nms=False, amp=True, augment=False,
auto_augment=randaugment, batch=16, bgr=0.0, box=7.5, cache=False,
cfg=None, classes=None, close_mosaic=10, cls=0.5, conf=None,
copy_paste=0.0, copy_paste_mode=flip, cos_lr=False, cutmix=0.0,
data=X-ray-cargo-object-detection-6/data.yaml, degrees=0.0,
deterministic=True, device=None, dfl=1.5, dnn=False, dropout=0.0,
dynamic=False, embed=None, epochs=35, erasing=0.4, exist_ok=False,
fliplr=0.5, flipud=0.0, format=torchscript, fraction=1.0, freeze=None,
half=False, hsv_h=0.015, hsv_s=0.7, hsv_v=0.4, imgsz=640, int8=False,
iou=0.7, keras=False, kobj=1.0, line_width=None, lr0=0.01, lrf=0.01,
mask_ratio=4, max_det=300, mixup=0.0, mode=train, model=yolov8n.pt,
momentum=0.937, mosaic=1.0, multi_scale=False, name=train, nbs=64,
nms=False, opset=None, optimize=False, optimizer=auto,
overlap_mask=True, patience=100, perspective=0.0, plots=True,
pose=12.0, pretrained=True, profile=False, project=None, rect=False,
resume=False, retina_masks=False, save=True, save_conf=False,
save_crop=False, save_dir=runs/detect/train, save_frames=False,
save_json=False, save_period=-1, save_txt=False, scale=0.5, seed=0,
shear=0.0, show=False, show_boxes=True, show_conf=True,
show_labels=True, simplify=True, single_cls=False, source=None,
split=val, stream_buffer=False, task=detect, time=None,
tracker=botsort.yaml, translate=0.1, val=True, verbose=True,
vid_stride=1, visualize=False, warmup_bias_lr=0.1, warmup_epochs=3.0,
warmup_momentum=0.8, weight_decay=0.0005, workers=8, workspace=None
Downloading https://ultralytics.com/assets/Arial.ttf to
'/root/.config/Ultralytics/Arial.ttf'...

100%|██████████| 755k/755k [00:00<00:00, 13.7MB/s]

Overriding model.yaml nc=80 with nc=2

                   from  n    params  module
arguments
  0                  -1  1       464  ultralytics.nn.modules.conv.Conv
[3, 16, 3, 2]
  1                  -1  1      4672  ultralytics.nn.modules.conv.Conv
[16, 32, 3, 2]
  2                  -1  1      7360  ultralytics.nn.modules.block.C2f
[32, 32, 1, True]
  3                  -1  1     18560  ultralytics.nn.modules.conv.Conv
[32, 64, 3, 2]
  4                  -1  2     49664  ultralytics.nn.modules.block.C2f
[64, 64, 2, True]
  5                  -1  1     73984  ultralytics.nn.modules.conv.Conv
[64, 128, 3, 2]
  6                  -1  2    197632  ultralytics.nn.modules.block.C2f
[128, 128, 2, True]
```

```
  7                  -1  1    295424  ultralytics.nn.modules.conv.Conv
[128, 256, 3, 2]
  8                  -1  1    460288  ultralytics.nn.modules.block.C2f
[256, 256, 1, True]
  9                  -1  1    164608
ultralytics.nn.modules.block.SPPF            [256, 256, 5]

 10                  -1  1         0
torch.nn.modules.upsampling.Upsample         [None, 2, 'nearest']

 11             [-1, 6]  1         0
ultralytics.nn.modules.conv.Concat           [1]

 12                  -1  1    148224  ultralytics.nn.modules.block.C2f
[384, 128, 1]
 13                  -1  1         0
torch.nn.modules.upsampling.Upsample         [None, 2, 'nearest']

 14             [-1, 4]  1         0
ultralytics.nn.modules.conv.Concat           [1]

 15                  -1  1     37248  ultralytics.nn.modules.block.C2f
[192, 64, 1]
 16                  -1  1     36992  ultralytics.nn.modules.conv.Conv
[64, 64, 3, 2]
 17            [-1, 12]  1         0
ultralytics.nn.modules.conv.Concat           [1]

 18                  -1  1    123648  ultralytics.nn.modules.block.C2f
[192, 128, 1]
 19                  -1  1    147712  ultralytics.nn.modules.conv.Conv
[128, 128, 3, 2]
 20             [-1, 9]  1         0
ultralytics.nn.modules.conv.Concat           [1]

 21                  -1  1    493056  ultralytics.nn.modules.block.C2f
[384, 256, 1]
 22        [15, 18, 21]  1    751702
ultralytics.nn.modules.head.Detect           [2, [64, 128, 256]]



Model summary: 129 layers, 3,011,238 parameters, 3,011,222 gradients,
8.2 GFLOPs

Transferred 319/355 items from pretrained weights
Freezing layer 'model.22.dfl.conv.weight'
AMP: running Automatic Mixed Precision (AMP) checks...
Downloading
https://github.com/ultralytics/assets/releases/download/v8.3.0/yolo11n
.pt to 'yolo11n.pt'...
```

```
100%|██████████| 5.35M/5.35M [00:00<00:00, 68.6MB/s]

AMP: checks passed 
train: Fast image access  (ping: 0.0±0.0 ms, read: 1408.9±821.6 MB/s,
size: 49.0 KB)

train: Scanning
/content/X-ray-cargo-object-detection-6/train/labels... 1292 images, 1
backgrounds, 0 corrupt: 100%|██████████| 1292/1292 [00:00<00:00,
1504.75it/s]

train: New cache created:
/content/X-ray-cargo-object-detection-6/train/labels.cache



albumentations: Blur(p=0.01, blur_limit=(3, 7)), MedianBlur(p=0.01,
blur_limit=(3, 7)), ToGray(p=0.01, method='weighted_average',
num_output_channels=3), CLAHE(p=0.01, clip_limit=(1.0, 4.0),
tile_grid_size=(8, 8))
val: Fast image access  (ping: 0.0±0.0 ms, read: 572.2±314.4 MB/s,
size: 40.2 KB)

val: Scanning /content/X-ray-cargo-object-detection-6/valid/labels...
369 images, 0 backgrounds, 0 corrupt: 100%|██████████| 369/369
[00:00<00:00, 1342.48it/s]

val: New cache created:
/content/X-ray-cargo-object-detection-6/valid/labels.cache



Plotting labels to runs/detect/train/labels.jpg...
optimizer: 'optimizer=auto' found, ignoring 'lr0=0.01' and
'momentum=0.937' and determining best 'optimizer', 'lr0' and
'momentum' automatically...
optimizer: AdamW(lr=0.001667, momentum=0.9) with parameter groups 57
weight(decay=0.0), 64 weight(decay=0.0005), 63 bias(decay=0.0)
Image sizes 640 train, 640 val
Using 8 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      2.14G      0.856      2.326      1.349         26
640: 100%|██████████| 81/81 [00:09<00:00,  8.74it/s]
                 Class     Images  Instances      Box(P          R
mAP50  mAP50-95): 100%|██████████| 12/12 [00:02<00:00,  4.08it/s]
```

```
                   all        369        369      0.546      0.442
0.436      0.269

      Epoch    GPU_mem   box_loss   cls_loss   dfl_loss  Instances
Size

       2/35      2.68G     0.7696       1.68      1.269         32
640: 100%|██████████| 81/81 [00:07<00:00, 10.98it/s]
                 Class     Images  Instances      Box(P          R
mAP50  mAP50-95): 100%|██████████| 12/12 [00:01<00:00,  7.46it/s]

                   all        369        369      0.342      0.367
0.285      0.176



      Epoch    GPU_mem   box_loss   cls_loss   dfl_loss  Instances
Size

       3/35       2.7G     0.7846      1.535      1.295         29
640: 100%|██████████| 81/81 [00:07<00:00, 11.16it/s]
                 Class     Images  Instances      Box(P          R
mAP50  mAP50-95): 100%|██████████| 12/12 [00:01<00:00,  7.36it/s]

                   all        369        369      0.347      0.386
0.275      0.132



      Epoch    GPU_mem   box_loss   cls_loss   dfl_loss  Instances
Size

       4/35      2.71G     0.7588      1.419       1.27         22
640: 100%|██████████| 81/81 [00:07<00:00, 11.40it/s]
                 Class     Images  Instances      Box(P          R
mAP50  mAP50-95): 100%|██████████| 12/12 [00:01<00:00,  7.65it/s]

                   all        369        369      0.496      0.555
0.539      0.355



      Epoch    GPU_mem   box_loss   cls_loss   dfl_loss  Instances
Size

       5/35      2.73G     0.6812      1.263      1.213         30
640: 100%|██████████| 81/81 [00:07<00:00, 11.34it/s]
                 Class     Images  Instances      Box(P          R
mAP50  mAP50-95): 100%|██████████| 12/12 [00:01<00:00,  7.70it/s]
```

```
                   all        369        369      0.462      0.597
0.53      0.426



      Epoch    GPU_mem   box_loss   cls_loss   dfl_loss  Instances
Size

       6/35      2.75G     0.6791      1.205       1.21         30
640: 100%|██████████| 81/81 [00:07<00:00, 11.43it/s]
                 Class     Images  Instances      Box(P          R
mAP50  mAP50-95): 100%|██████████| 12/12 [00:01<00:00,  7.82it/s]

                   all        369        369       0.61      0.602
0.62      0.454



      Epoch    GPU_mem   box_loss   cls_loss   dfl_loss  Instances
Size

       7/35      2.76G     0.6199      1.153       1.19         29
640: 100%|██████████| 81/81 [00:06<00:00, 11.57it/s]
                 Class     Images  Instances      Box(P          R
mAP50  mAP50-95): 100%|██████████| 12/12 [00:01<00:00,  8.09it/s]

                   all        369        369      0.529      0.606
0.546      0.374



      Epoch    GPU_mem   box_loss   cls_loss   dfl_loss  Instances
Size

       8/35      2.78G     0.6219      1.106      1.171         28
640: 100%|██████████| 81/81 [00:07<00:00, 11.42it/s]
                 Class     Images  Instances      Box(P          R
mAP50  mAP50-95): 100%|██████████| 12/12 [00:01<00:00,  7.97it/s]

                   all        369        369      0.691      0.634
0.66      0.518



      Epoch    GPU_mem   box_loss   cls_loss   dfl_loss  Instances
Size

       9/35       2.8G     0.5847      1.057       1.16         33
640: 100%|██████████| 81/81 [00:07<00:00, 11.55it/s]
```

```
                 Class     Images  Instances      Box(P          R
mAP50  mAP50-95): 100%|██████████| 12/12 [00:01<00:00,  7.77it/s]

                   all        369        369      0.633      0.687
0.688      0.553



      Epoch    GPU_mem   box_loss   cls_loss   dfl_loss  Instances
Size

      10/35      2.81G      0.586       1.05      1.146         39
640: 100%|██████████| 81/81 [00:07<00:00, 11.48it/s]
                 Class     Images  Instances      Box(P          R
mAP50  mAP50-95): 100%|██████████| 12/12 [00:01<00:00,  7.95it/s]

                   all        369        369      0.667      0.661
0.68      0.463



      Epoch    GPU_mem   box_loss   cls_loss   dfl_loss  Instances
Size

      11/35      2.83G     0.5613      1.009       1.14         29
640: 100%|██████████| 81/81 [00:07<00:00, 11.38it/s]
                 Class     Images  Instances      Box(P          R
mAP50  mAP50-95): 100%|██████████| 12/12 [00:01<00:00,  8.01it/s]

                   all        369        369      0.689      0.699
0.688      0.502



      Epoch    GPU_mem   box_loss   cls_loss   dfl_loss  Instances
Size

      12/35      2.85G     0.5285     0.9757      1.106         30
640: 100%|██████████| 81/81 [00:07<00:00, 11.23it/s]
                 Class     Images  Instances      Box(P          R
mAP50  mAP50-95): 100%|██████████| 12/12 [00:01<00:00,  8.04it/s]

                   all        369        369       0.66       0.67
0.722      0.558



      Epoch    GPU_mem   box_loss   cls_loss   dfl_loss  Instances
Size
```

```
      13/35      2.87G     0.5106     0.9441      1.104         33
640: 100%|██████████| 81/81 [00:07<00:00, 11.57it/s]
                 Class     Images  Instances      Box(P          R
mAP50  mAP50-95): 100%|██████████| 12/12 [00:01<00:00,  7.75it/s]

                   all        369        369      0.812      0.654
0.773      0.603



      Epoch    GPU_mem   box_loss   cls_loss   dfl_loss  Instances
Size

      14/35      2.88G     0.5464     0.9382      1.125         30
640: 100%|██████████| 81/81 [00:06<00:00, 11.62it/s]
                 Class     Images  Instances      Box(P          R
mAP50  mAP50-95): 100%|██████████| 12/12 [00:01<00:00,  8.01it/s]

                   all        369        369      0.792      0.681
0.763      0.617



      Epoch    GPU_mem   box_loss   cls_loss   dfl_loss  Instances
Size

      15/35       2.9G      0.487     0.8964      1.085         22
640: 100%|██████████| 81/81 [00:07<00:00, 11.34it/s]
                 Class     Images  Instances      Box(P          R
mAP50  mAP50-95): 100%|██████████| 12/12 [00:01<00:00,  8.03it/s]

                   all        369        369      0.749      0.744
0.783      0.605



      Epoch    GPU_mem   box_loss   cls_loss   dfl_loss  Instances
Size

      16/35      2.92G       0.51     0.8917      1.087         31
640: 100%|██████████| 81/81 [00:07<00:00, 11.34it/s]
                 Class     Images  Instances      Box(P          R
mAP50  mAP50-95): 100%|██████████| 12/12 [00:01<00:00,  8.00it/s]

                   all        369        369      0.789      0.727
0.821      0.661
```

```
      Epoch    GPU_mem   box_loss   cls_loss   dfl_loss  Instances
Size

      17/35      2.93G     0.4723     0.8708      1.074         25
640: 100%|██████████| 81/81 [00:06<00:00, 11.70it/s]
                 Class     Images  Instances      Box(P          R
mAP50  mAP50-95): 100%|██████████| 12/12 [00:01<00:00,  8.12it/s]

                   all        369        369       0.73      0.741
0.796      0.645



      Epoch    GPU_mem   box_loss   cls_loss   dfl_loss  Instances
Size

      18/35      2.95G       0.48     0.8622      1.082         26
640: 100%|██████████| 81/81 [00:07<00:00, 11.32it/s]
                 Class     Images  Instances      Box(P          R
mAP50  mAP50-95): 100%|██████████| 12/12 [00:01<00:00,  7.82it/s]

                   all        369        369       0.76      0.717
0.787      0.581



      Epoch    GPU_mem   box_loss   cls_loss   dfl_loss  Instances
Size

      19/35      2.97G     0.4476     0.8222      1.055         25
640: 100%|██████████| 81/81 [00:07<00:00, 11.25it/s]
                 Class     Images  Instances      Box(P          R
mAP50  mAP50-95): 100%|██████████| 12/12 [00:01<00:00,  7.60it/s]

                   all        369        369      0.821      0.699
0.816      0.637



      Epoch    GPU_mem   box_loss   cls_loss   dfl_loss  Instances
Size

      20/35      2.98G     0.4536     0.8268      1.054         32
640: 100%|██████████| 81/81 [00:07<00:00, 11.43it/s]
                 Class     Images  Instances      Box(P          R
mAP50  mAP50-95): 100%|██████████| 12/12 [00:01<00:00,  7.98it/s]

                   all        369        369      0.797      0.791
0.839      0.641
```

```
      Epoch    GPU_mem   box_loss   cls_loss   dfl_loss  Instances
Size

      21/35         3G     0.4335     0.7743       1.05         36
640: 100%|██████████| 81/81 [00:07<00:00, 11.21it/s]
                 Class     Images  Instances      Box(P          R
mAP50  mAP50-95): 100%|██████████| 12/12 [00:01<00:00,  7.09it/s]

                   all        369        369      0.796       0.79
0.835      0.683



      Epoch    GPU_mem   box_loss   cls_loss   dfl_loss  Instances
Size

      22/35      3.02G     0.4196     0.7753      1.042         24
640: 100%|██████████| 81/81 [00:07<00:00, 11.04it/s]
                 Class     Images  Instances      Box(P          R
mAP50  mAP50-95): 100%|██████████| 12/12 [00:01<00:00,  8.08it/s]

                   all        369        369      0.785      0.812
0.856      0.705



      Epoch    GPU_mem   box_loss   cls_loss   dfl_loss  Instances
Size

      23/35      3.04G     0.4069     0.7609      1.029         25
640: 100%|██████████| 81/81 [00:07<00:00, 11.40it/s]
                 Class     Images  Instances      Box(P          R
mAP50  mAP50-95): 100%|██████████| 12/12 [00:01<00:00,  8.06it/s]

                   all        369        369      0.882       0.77
0.865      0.722



      Epoch    GPU_mem   box_loss   cls_loss   dfl_loss  Instances
Size

      24/35      3.05G     0.4089     0.7504      1.032         24
640: 100%|██████████| 81/81 [00:07<00:00, 11.29it/s]
                 Class     Images  Instances      Box(P          R
mAP50  mAP50-95): 100%|██████████| 12/12 [00:01<00:00,  7.72it/s]
```

```
                   all        369        369      0.868      0.785
0.859      0.726



      Epoch    GPU_mem   box_loss   cls_loss   dfl_loss  Instances
Size

      25/35      3.07G     0.3933     0.7161      1.031         27
640: 100%|██████████| 81/81 [00:07<00:00, 11.20it/s]
                 Class     Images  Instances      Box(P          R
mAP50  mAP50-95): 100%|██████████| 12/12 [00:01<00:00,  8.10it/s]

                   all        369        369      0.803      0.828
0.88      0.745


Closing dataloader mosaic
albumentations: Blur(p=0.01, blur_limit=(3, 7)), MedianBlur(p=0.01,
blur_limit=(3, 7)), ToGray(p=0.01, method='weighted_average',
num_output_channels=3), CLAHE(p=0.01, clip_limit=(1.0, 4.0),
tile_grid_size=(8, 8))

      Epoch    GPU_mem   box_loss   cls_loss   dfl_loss  Instances
Size

      26/35      3.09G     0.5558     0.7401      1.115         12
640: 100%|██████████| 81/81 [00:07<00:00, 10.48it/s]
                 Class     Images  Instances      Box(P          R
mAP50  mAP50-95): 100%|██████████| 12/12 [00:01<00:00,  7.81it/s]

                   all        369        369      0.851      0.807
0.868      0.703



      Epoch    GPU_mem   box_loss   cls_loss   dfl_loss  Instances
Size

      27/35      3.11G     0.5258      0.646      1.094         12
640: 100%|██████████| 81/81 [00:06<00:00, 11.77it/s]
                 Class     Images  Instances      Box(P          R
mAP50  mAP50-95): 100%|██████████| 12/12 [00:01<00:00,  7.72it/s]

                   all        369        369      0.864      0.834
0.889      0.759
```

```
      Epoch    GPU_mem   box_loss   cls_loss   dfl_loss  Instances
Size

      28/35      3.12G     0.5015     0.5906      1.065         12
640: 100%|██████████| 81/81 [00:06<00:00, 11.95it/s]
                 Class     Images  Instances      Box(P          R
mAP50  mAP50-95): 100%|██████████| 12/12 [00:01<00:00,  8.32it/s]

                   all        369        369      0.813      0.865
0.894      0.757

      Epoch    GPU_mem   box_loss   cls_loss   dfl_loss  Instances
Size

      29/35      3.14G     0.5047     0.6101       1.08         12
640: 100%|██████████| 81/81 [00:07<00:00, 11.56it/s]
                 Class     Images  Instances      Box(P          R
mAP50  mAP50-95): 100%|██████████| 12/12 [00:01<00:00,  7.99it/s]

                   all        369        369       0.86      0.875
0.901      0.773



      Epoch    GPU_mem   box_loss   cls_loss   dfl_loss  Instances
Size

      30/35      3.16G     0.4778      0.569      1.053         12
640: 100%|██████████| 81/81 [00:06<00:00, 11.61it/s]
                 Class     Images  Instances      Box(P          R
mAP50  mAP50-95): 100%|██████████| 12/12 [00:01<00:00,  8.28it/s]

                   all        369        369       0.89      0.833
0.908      0.776



      Epoch    GPU_mem   box_loss   cls_loss   dfl_loss  Instances
Size

      31/35      3.17G     0.4695     0.5428      1.051         12
640: 100%|██████████| 81/81 [00:06<00:00, 12.02it/s]
                 Class     Images  Instances      Box(P          R
mAP50  mAP50-95): 100%|██████████| 12/12 [00:01<00:00,  8.03it/s]

                   all        369        369      0.888       0.83
0.912      0.781
```

```
      Epoch    GPU_mem   box_loss   cls_loss   dfl_loss  Instances
Size

      32/35      3.19G     0.4647     0.5337      1.051         12
640: 100%|██████████| 81/81 [00:06<00:00, 11.74it/s]
                 Class     Images  Instances      Box(P          R
mAP50  mAP50-95): 100%|██████████| 12/12 [00:01<00:00,  8.07it/s]

                   all        369        369      0.856       0.85
0.913      0.787



      Epoch    GPU_mem   box_loss   cls_loss   dfl_loss  Instances
Size

      33/35      3.21G     0.4547      0.514      1.035         12
640: 100%|██████████| 81/81 [00:06<00:00, 11.73it/s]
                 Class     Images  Instances      Box(P          R
mAP50  mAP50-95): 100%|██████████| 12/12 [00:01<00:00,  8.21it/s]

                   all        369        369      0.886      0.853
0.916      0.787



      Epoch    GPU_mem   box_loss   cls_loss   dfl_loss  Instances
Size

      34/35      3.22G     0.4406     0.4838       1.02         12
640: 100%|██████████| 81/81 [00:06<00:00, 11.72it/s]
                 Class     Images  Instances      Box(P          R
mAP50  mAP50-95): 100%|██████████| 12/12 [00:01<00:00,  8.10it/s]

                   all        369        369      0.898      0.865
0.916      0.801



      Epoch    GPU_mem   box_loss   cls_loss   dfl_loss  Instances
Size

      35/35      3.24G     0.4324     0.4613      1.015         12
640: 100%|██████████| 81/81 [00:06<00:00, 11.83it/s]
                 Class     Images  Instances      Box(P          R
mAP50  mAP50-95): 100%|██████████| 12/12 [00:01<00:00,  8.25it/s]

                   all        369        369      0.923       0.84
0.92      0.803
```

```
35 epochs completed in 0.087 hours.
Optimizer stripped from runs/detect/train/weights/last.pt, 6.2MB
Optimizer stripped from runs/detect/train/weights/best.pt, 6.2MB

Validating runs/detect/train/weights/best.pt...
Ultralytics 8.3.161 🚀 Python-3.11.13 torch-2.6.0+cu124 CUDA:0 (NVIDIA
A100-SXM4-40GB, 40507MiB)
Model summary (fused): 72 layers, 3,006,038 parameters, 0 gradients,
8.1 GFLOPs

                 Class     Images  Instances      Box(P          R
mAP50  mAP50-95): 100%|██████████| 12/12 [00:02<00:00,  5.23it/s]

                   all        369        369      0.924      0.839
0.92      0.803
           Normal-Case        157        157      0.907      0.917
0.965      0.963
          Sharp Object        212        212      0.942      0.762
0.875      0.642
Speed: 0.1ms preprocess, 0.5ms inference, 0.0ms loss, 1.3ms
postprocess per image
Results saved to runs/detect/train

============================================================
TRAINING COMPLETED!
Best model saved in folder: runs/detect/train
Model file to be used for API is 'best.pt'
============================================================

!mkdir -p /content/drive/MyDrive/My_AI_Models


!cp /content/runs/detect/train/weights/best.pt
/content/drive/MyDrive/My_AI_Models/xray_cargo_dangerous.pt

print("File 'xray_cargo_danger.pt' saved on 'My_AI_Models'!")

File 'xray_cargo_danger.pt' saved on 'My_AI_Models'!
```

What kind of Items Model Training

```
rf = Roboflow(api_key="wLBN5d9AgXyh35mEwYPW")
project = rf.workspace("reasondroworkspace").project("final-datasets-
wko1f-nvnmo")
version = project.version(2)
dataset = version.download("yolov8")
```

```
loading Roboflow workspace...
loading Roboflow project...

# --- CONFIGURATION: DEFINE YOUR CLEANUP RULES HERE ---

# 1. List the OLD, messy class names EXACTLY as they appear in your
original data.yaml
#    You can find this file at 'Final-Datasets-2/data.yaml'
#    I've pre-filled this based on your screenshot and logs. Double-
check it!
old_names = [
    '---- -----', 'auto parts', 'bags', 'bicycle', 'car weels',
'clohes',
    'clothes', 'fabrics', 'lamps', 'object', 'office supplies',
'shoes',
    'spare parts', 'table ware', 'table warre', 'tableware',
'tablware',
    'tetiles', 'texstiles', 'textile', 'textiles', 'tools', 'toys',
'фгещ зфкеы'
]

# 2. Define your NEW, clean class list.
new_names = [
    'Bags', 'Bicycle', 'Clothes', 'Textile', 'Lamps',
'Office_Supplies',
    'Shoes', 'Spare_Part', 'Tableware', 'Tools', 'Toys'
]

# 3. Create the mapping from OLD class name to NEW class name.
#    This tells the script how to consolidate everything.
consolidation_map = {
    # Mapping to 'Bags'
    'bags': 'Bags',
    # Mapping to 'Bicycle'
    'bicycle': 'Bicycle',
    # Mapping to 'Clothes'
    'clohes': 'Clothes',
    'clothes': 'Clothes',
    # Mapping to 'Textile'
    'fabrics': 'Textile',
    'tetiles': 'Textile',
    'texstiles': 'Textile',
    'textile': 'Textile',
    'textiles': 'Textile',
    # Mapping to 'Lamps'
    'lamps': 'Lamps',
    # Mapping to 'Office_Supplies'
    'office supplies': 'Office_Supplies',
    'фгещ зфкеы': 'Office_Supplies', # The cyrillic version
    # Mapping to 'Shoes'
```

```
    'shoes': 'Shoes',
    # Mapping to 'Spare_Part'
    'auto parts': 'Spare_Part',
    'spare parts': 'Spare_Part',
    'car weels': 'Spare_Part',
    # Mapping to 'Tableware'
    'table ware': 'Tableware',
    'table warre': 'Tableware',
    'tableware': 'Tableware',
    'tablware': 'Tableware',
    # Mapping to 'Tools'
    'tools': 'Tools',
    # Mapping to 'Toys'
    'toys': 'Toys'
    # Classes '---- -----'' and 'object' are ignored as they are too
generic.
}

# --- SCRIPT LOGIC: DO NOT MODIFY BELOW THIS LINE ---

print("--- Starting Manual Class Remapping ---")

# Create the mapping from old index to new index
old_name_to_idx = {name: i for i, name in enumerate(old_names)}
new_name_to_idx = {name: i for i, name in enumerate(new_names)}

class_mapping = {}
for old_name, new_name in consolidation_map.items():
    if old_name in old_name_to_idx and new_name in new_name_to_idx:
        old_idx = old_name_to_idx[old_name]
        new_idx = new_name_to_idx[new_name]
        class_mapping[old_idx] = new_idx

print("Generated Index Mapping (Old Index -> New Index):")
print(class_mapping)

# Get the path to the dataset directory
dataset_path = 'Final-Datasets-2'
label_dirs = [
    os.path.join(dataset_path, 'train', 'labels'),
    os.path.join(dataset_path, 'valid', 'labels'),
    os.path.join(dataset_path, 'test', 'labels') # Also check test
folder just in case
]

# Process each label file
for label_dir in label_dirs:
    if not os.path.exists(label_dir):
        continue
```

```
    print(f"\nProcessing directory: {label_dir}")
    file_count = 0
    for filename in os.listdir(label_dir):
        if filename.endswith('.txt'):
            file_path = os.path.join(label_dir, filename)

            with open(file_path, 'r') as f:
                lines = f.readlines()

            new_lines = []
            for line in lines:
                parts = line.strip().split()
                if not parts:
                    continue

                old_class_id = int(parts[0])

                # If the old class is in our mapping, change its ID
                if old_class_id in class_mapping:
                    new_class_id = class_mapping[old_class_id]
                    new_line = f"{new_class_id} {' '.join(parts[1:])}"
                    new_lines.append(new_line)
                # else, we are discarding the annotation (e.g., for
'object')

            # Write the modified lines back to the file
            with open(file_path, 'w') as f:
                f.write('\n'.join(new_lines))
            file_count += 1
    print(f"Processed {file_count} files.")


# 4. Create a new, clean data.yaml file
new_yaml_path = os.path.join(dataset_path, 'data_cleaned.yaml')
original_yaml_path = os.path.join(dataset_path, 'data.yaml')

# Load original yaml to get train/val paths
with open(original_yaml_path, 'r') as f:
    original_yaml_data = yaml.safe_load(f)

new_yaml_data = {
    'train': original_yaml_data['train'],
    'val': original_yaml_data['val'],
    'test': original_yaml_data.get('test', None), # Keep test path if
it exists
    'nc': len(new_names),
    'names': new_names
}

with open(new_yaml_path, 'w') as f:
```

```
    yaml.dump(new_yaml_data, f, default_flow_style=False)

print(f"\nSuccessfully created new config file at: {new_yaml_path}")
print("--- Remapping Complete! You can now start training. ---")
```

```
--- Starting Manual Class Remapping ---
Generated Index Mapping (Old Index -> New Index):
{2: 0, 3: 1, 5: 2, 6: 2, 7: 3, 17: 3, 18: 3, 19: 3, 20: 3, 8: 4, 10:
5, 23: 5, 11: 6, 1: 7, 12: 7, 4: 7, 13: 8, 14: 8, 15: 8, 16: 8, 21: 9,
22: 10}

Processing directory: Final-Datasets-2/train/labels
Processed 462 files.

Processing directory: Final-Datasets-2/valid/labels
Processed 132 files.

Processing directory: Final-Datasets-2/test/labels
Processed 65 files.

Successfully created new config file at:
Final-Datasets-2/data_cleaned.yaml
--- Remapping Complete! You can now start training. ---
```

```
def main():
    device = 'cuda' if torch.cuda.is_available() else 'cpu'
    print(f"Items Model Training will run on: {device}")

    # ?  1. load da pre trained YOLOv8 model.
    print("Loading pre-trained YOLOv8 model...")
    model = YOLO('yolov8n.pt')


    # ? 2. training
    print("Starting model fine-tuning process...")
    results = model.train(data='Final-Datasets-2/data_cleaned.yaml',
epochs=35, imgsz=640)


    print("\n============================================================")
    print("TRAINING COMPLETED!")
    print(f"Best model saved in folder: {results.save_dir}")
    print("Model file to be used for API is 'best.pt'")
    print("============================================================")


if __name__ == '__main__':
    main()
```

```
Items Model Training will run on: cuda
Loading pre-trained YOLOv8 model...
```

```
Starting model fine-tuning process...
Ultralytics 8.3.161 🚀 Python-3.11.13 torch-2.6.0+cu124 CUDA:0 (NVIDIA
A100-SXM4-40GB, 40507MiB)
engine/trainer: agnostic_nms=False, amp=True, augment=False,
auto_augment=randaugment, batch=16, bgr=0.0, box=7.5, cache=False,
cfg=None, classes=None, close_mosaic=10, cls=0.5, conf=None,
copy_paste=0.0, copy_paste_mode=flip, cos_lr=False, cutmix=0.0,
data=Final-Datasets-2/data_cleaned.yaml, degrees=0.0,
deterministic=True, device=None, dfl=1.5, dnn=False, dropout=0.0,
dynamic=False, embed=None, epochs=35, erasing=0.4, exist_ok=False,
fliplr=0.5, flipud=0.0, format=torchscript, fraction=1.0, freeze=None,
half=False, hsv_h=0.015, hsv_s=0.7, hsv_v=0.4, imgsz=640, int8=False,
iou=0.7, keras=False, kobj=1.0, line_width=None, lr0=0.01, lrf=0.01,
mask_ratio=4, max_det=300, mixup=0.0, mode=train, model=yolov8n.pt,
momentum=0.937, mosaic=1.0, multi_scale=False, name=train6, nbs=64,
nms=False, opset=None, optimize=False, optimizer=auto,
overlap_mask=True, patience=100, perspective=0.0, plots=True,
pose=12.0, pretrained=True, profile=False, project=None, rect=False,
resume=False, retina_masks=False, save=True, save_conf=False,
save_crop=False, save_dir=runs/detect/train6, save_frames=False,
save_json=False, save_period=-1, save_txt=False, scale=0.5, seed=0,
shear=0.0, show=False, show_boxes=True, show_conf=True,
show_labels=True, simplify=True, single_cls=False, source=None,
split=val, stream_buffer=False, task=detect, time=None,
tracker=botsort.yaml, translate=0.1, val=True, verbose=True,
vid_stride=1, visualize=False, warmup_bias_lr=0.1, warmup_epochs=3.0,
warmup_momentum=0.8, weight_decay=0.0005, workers=8, workspace=None
Overriding model.yaml nc=80 with nc=11

                   from  n    params  module
arguments
  0                  -1  1       464  ultralytics.nn.modules.conv.Conv
[3, 16, 3, 2]
  1                  -1  1      4672  ultralytics.nn.modules.conv.Conv
[16, 32, 3, 2]
  2                  -1  1      7360  ultralytics.nn.modules.block.C2f
[32, 32, 1, True]
  3                  -1  1     18560  ultralytics.nn.modules.conv.Conv
[32, 64, 3, 2]
  4                  -1  2     49664  ultralytics.nn.modules.block.C2f
[64, 64, 2, True]
  5                  -1  1     73984  ultralytics.nn.modules.conv.Conv
[64, 128, 3, 2]
  6                  -1  2    197632  ultralytics.nn.modules.block.C2f
[128, 128, 2, True]
  7                  -1  1    295424  ultralytics.nn.modules.conv.Conv
[128, 256, 3, 2]
  8                  -1  1    460288  ultralytics.nn.modules.block.C2f
[256, 256, 1, True]
```

```
  9                  -1  1    164608
ultralytics.nn.modules.block.SPPF            [256, 256, 5]

 10                  -1  1         0
torch.nn.modules.upsampling.Upsample         [None, 2, 'nearest']

 11             [-1, 6]  1         0
ultralytics.nn.modules.conv.Concat           [1]

 12                  -1  1    148224  ultralytics.nn.modules.block.C2f
[384, 128, 1]
 13                  -1  1         0
torch.nn.modules.upsampling.Upsample         [None, 2, 'nearest']

 14             [-1, 4]  1         0
ultralytics.nn.modules.conv.Concat           [1]

 15                  -1  1     37248  ultralytics.nn.modules.block.C2f
[192, 64, 1]
 16                  -1  1     36992  ultralytics.nn.modules.conv.Conv
[64, 64, 3, 2]
 17            [-1, 12]  1         0
ultralytics.nn.modules.conv.Concat           [1]

 18                  -1  1    123648  ultralytics.nn.modules.block.C2f
[192, 128, 1]
 19                  -1  1    147712  ultralytics.nn.modules.conv.Conv
[128, 128, 3, 2]
 20             [-1, 9]  1         0
ultralytics.nn.modules.conv.Concat           [1]

 21                  -1  1    493056  ultralytics.nn.modules.block.C2f
[384, 256, 1]
 22        [15, 18, 21]  1    753457
ultralytics.nn.modules.head.Detect           [11, [64, 128, 256]]

Model summary: 129 layers, 3,012,993 parameters, 3,012,977 gradients,
8.2 GFLOPs

Transferred 319/355 items from pretrained weights
Freezing layer 'model.22.dfl.conv.weight'
AMP: running Automatic Mixed Precision (AMP) checks...
AMP: checks passed □
train: Fast image access □ (ping: 0.0±0.0 ms, read: 1252.9±584.4 MB/s,
size: 53.3 KB)

train: Scanning /content/Final-Datasets-2/train/labels.cache... 462
images, 204 backgrounds, 0 corrupt: 100%|██████████| 462/462 [00:00<?,
?it/s]
```

```
albumentations: Blur(p=0.01, blur_limit=(3, 7)), MedianBlur(p=0.01,
blur_limit=(3, 7)), ToGray(p=0.01, method='weighted_average',
num_output_channels=3), CLAHE(p=0.01, clip_limit=(1.0, 4.0),
tile_grid_size=(8, 8))



val: Fast image access  (ping: 0.0±0.0 ms, read: 505.9±147.6 MB/s,
size: 55.5 KB)

val: Scanning /content/Final-Datasets-2/valid/labels.cache... 132
images, 60 backgrounds, 0 corrupt: 100%|██████████| 132/132
[00:00<?, ?it/s]

Plotting labels to runs/detect/train6/labels.jpg...
optimizer: 'optimizer=auto' found, ignoring 'lr0=0.01' and
'momentum=0.937' and determining best 'optimizer', 'lr0' and
'momentum' automatically...
optimizer: AdamW(lr=0.000667, momentum=0.9) with parameter groups 57
weight(decay=0.0), 64 weight(decay=0.0005), 63 bias(decay=0.0)
Image sizes 640 train, 640 val
Using 8 dataloader workers
Logging results to runs/detect/train6
Starting training for 35 epochs...

      Epoch    GPU_mem   box_loss   cls_loss   dfl_loss  Instances
Size

       1/35      2.18G      1.722      4.706       1.87         26
640: 100%|██████████| 29/29 [00:03<00:00,  8.83it/s]
                 Class     Images  Instances      Box(P          R
mAP50  mAP50-95): 100%|██████████| 5/5 [00:00<00:00,  7.29it/s]

                   all        132         97    0.00314      0.632
0.0395     0.0212




      Epoch    GPU_mem   box_loss   cls_loss   dfl_loss  Instances
Size

       2/35       2.7G      1.288      3.851      1.552         24
640: 100%|██████████| 29/29 [00:02<00:00, 11.01it/s]
                 Class     Images  Instances      Box(P          R
mAP50  mAP50-95): 100%|██████████| 5/5 [00:00<00:00,  8.49it/s]

                   all        132         97    0.00285      0.728
0.0427     0.0284

      Epoch    GPU_mem   box_loss   cls_loss   dfl_loss  Instances
Size
```

```
       3/35       2.7G      1.326      3.714      1.549         25
640: 100%|██████████| 29/29 [00:02<00:00, 11.35it/s]
                 Class     Images  Instances      Box(P          R
mAP50  mAP50-95): 100%|██████████| 5/5 [00:00<00:00,  8.55it/s]

                   all        132         97      0.785       0.14
0.0756     0.0491

      Epoch    GPU_mem   box_loss   cls_loss   dfl_loss  Instances
Size

       4/35       2.7G      1.318      3.603      1.559         26
640: 100%|██████████| 29/29 [00:02<00:00, 10.74it/s]
                 Class     Images  Instances      Box(P          R
mAP50  mAP50-95): 100%|██████████| 5/5 [00:00<00:00,  8.66it/s]

                   all        132         97      0.771      0.141
0.0566     0.0377

      Epoch    GPU_mem   box_loss   cls_loss   dfl_loss  Instances
Size

       5/35       2.7G      1.329      3.527      1.549         28
640: 100%|██████████| 29/29 [00:02<00:00, 11.25it/s]
                 Class     Images  Instances      Box(P          R
mAP50  mAP50-95): 100%|██████████| 5/5 [00:00<00:00,  8.64it/s]

                   all        132         97      0.789     0.0759
0.0547     0.0367

      Epoch    GPU_mem   box_loss   cls_loss   dfl_loss  Instances
Size

       6/35       2.7G       1.26      3.368      1.501         31
640: 100%|██████████| 29/29 [00:02<00:00, 11.12it/s]
                 Class     Images  Instances      Box(P          R
mAP50  mAP50-95): 100%|██████████| 5/5 [00:00<00:00,  8.96it/s]

                   all        132         97      0.659      0.165
0.0634     0.0452

      Epoch    GPU_mem   box_loss   cls_loss   dfl_loss  Instances
Size

       7/35       2.7G       1.33      3.369      1.548         30
640: 100%|██████████| 29/29 [00:02<00:00, 10.79it/s]
                 Class     Images  Instances      Box(P          R
mAP50  mAP50-95): 100%|██████████| 5/5 [00:00<00:00,  8.89it/s]

                   all        132         97      0.663      0.136
0.106     0.0579
```

```
      Epoch    GPU_mem   box_loss   cls_loss   dfl_loss  Instances
Size

       8/35       2.7G      1.217      3.069      1.483         31
640: 100%|██████████| 29/29 [00:02<00:00, 11.28it/s]
                 Class     Images  Instances      Box(P          R
mAP50  mAP50-95): 100%|██████████| 5/5 [00:00<00:00,  8.87it/s]

                   all        132         97      0.799      0.147
0.087     0.0565

      Epoch    GPU_mem   box_loss   cls_loss   dfl_loss  Instances
Size

       9/35       2.7G      1.216      3.132      1.503         27
640: 100%|██████████| 29/29 [00:02<00:00, 11.43it/s]
                 Class     Images  Instances      Box(P          R
mAP50  mAP50-95): 100%|██████████| 5/5 [00:00<00:00,  9.20it/s]

                   all        132         97      0.467       0.14
0.096       0.06

      Epoch    GPU_mem   box_loss   cls_loss   dfl_loss  Instances
Size

      10/35       2.7G      1.286      3.059      1.514         26
640: 100%|██████████| 29/29 [00:02<00:00, 11.22it/s]
                 Class     Images  Instances      Box(P          R
mAP50  mAP50-95): 100%|██████████| 5/5 [00:00<00:00,  9.66it/s]

                   all        132         97      0.657      0.152
0.113     0.0776



      Epoch    GPU_mem   box_loss   cls_loss   dfl_loss  Instances
Size

      11/35       2.7G      1.172      2.825      1.438         22
640: 100%|██████████| 29/29 [00:02<00:00, 11.14it/s]
                 Class     Images  Instances      Box(P          R
mAP50  mAP50-95): 100%|██████████| 5/5 [00:00<00:00,  9.63it/s]

                   all        132         97      0.532       0.13
0.0931      0.069

      Epoch    GPU_mem   box_loss   cls_loss   dfl_loss  Instances
Size

      12/35       2.7G      1.189      2.865      1.453         18
640: 100%|██████████| 29/29 [00:02<00:00, 11.17it/s]
```

```
                 Class     Images  Instances      Box(P          R
mAP50  mAP50-95): 100%|██████████| 5/5 [00:00<00:00,  9.90it/s]

                   all        132         97      0.672      0.147
0.0794     0.0592



      Epoch    GPU_mem   box_loss   cls_loss   dfl_loss  Instances
Size

      13/35       2.7G      1.196      2.852      1.457         23
640: 100%|██████████| 29/29 [00:02<00:00, 11.56it/s]
                 Class     Images  Instances      Box(P          R
mAP50  mAP50-95): 100%|██████████| 5/5 [00:00<00:00,  9.59it/s]

                   all        132         97      0.711      0.112
0.095     0.0696



      Epoch    GPU_mem   box_loss   cls_loss   dfl_loss  Instances
Size

      14/35       2.7G      1.124      2.774      1.397         22
640: 100%|██████████| 29/29 [00:02<00:00, 11.51it/s]
                 Class     Images  Instances      Box(P          R
mAP50  mAP50-95): 100%|██████████| 5/5 [00:00<00:00, 10.00it/s]

                   all        132         97       0.81      0.138
0.119     0.0762



      Epoch    GPU_mem   box_loss   cls_loss   dfl_loss  Instances
Size

      15/35       2.7G      1.191      2.725      1.475         27
640: 100%|██████████| 29/29 [00:02<00:00, 10.93it/s]
                 Class     Images  Instances      Box(P          R
mAP50  mAP50-95): 100%|██████████| 5/5 [00:00<00:00,  9.86it/s]

                   all        132         97      0.845      0.133
0.146     0.0992



      Epoch    GPU_mem   box_loss   cls_loss   dfl_loss  Instances
Size
```

```
      16/35       2.7G      1.111      2.639      1.392         21
640: 100%|██████████| 29/29 [00:02<00:00, 11.22it/s]
                 Class     Images  Instances      Box(P          R
mAP50  mAP50-95): 100%|██████████| 5/5 [00:00<00:00, 10.10it/s]

                   all        132         97      0.569      0.154
0.114     0.0728



      Epoch    GPU_mem   box_loss   cls_loss   dfl_loss  Instances
Size

      17/35       2.7G      1.131       2.81      1.422         18
640: 100%|██████████| 29/29 [00:02<00:00, 11.06it/s]
                 Class     Images  Instances      Box(P          R
mAP50  mAP50-95): 100%|██████████| 5/5 [00:00<00:00,  9.71it/s]

                   all        132         97      0.648      0.169
0.156      0.132



      Epoch    GPU_mem   box_loss   cls_loss   dfl_loss  Instances
Size

      18/35       2.7G      1.116      2.686      1.408         26
640: 100%|██████████| 29/29 [00:02<00:00, 10.89it/s]
                 Class     Images  Instances      Box(P          R
mAP50  mAP50-95): 100%|██████████| 5/5 [00:00<00:00,  9.82it/s]

                   all        132         97      0.664      0.238
0.188       0.12



      Epoch    GPU_mem   box_loss   cls_loss   dfl_loss  Instances
Size

      19/35       2.7G      1.128      2.717      1.419         35
640: 100%|██████████| 29/29 [00:02<00:00, 11.55it/s]
                 Class     Images  Instances      Box(P          R
mAP50  mAP50-95): 100%|██████████| 5/5 [00:00<00:00,  9.75it/s]

                   all        132         97      0.703      0.118
0.108     0.0725
```

```
      Epoch    GPU_mem   box_loss   cls_loss   dfl_loss  Instances
Size

      20/35      2.71G      1.052      2.546      1.357         18
640: 100%|██████████| 29/29 [00:02<00:00, 10.78it/s]
                 Class     Images  Instances      Box(P          R
mAP50  mAP50-95): 100%|██████████| 5/5 [00:00<00:00, 10.48it/s]

                   all        132         97      0.729      0.173
0.172      0.101



      Epoch    GPU_mem   box_loss   cls_loss   dfl_loss  Instances
Size

      21/35      2.71G      1.055      2.464      1.359         27
640: 100%|██████████| 29/29 [00:02<00:00, 11.27it/s]
                 Class     Images  Instances      Box(P          R
mAP50  mAP50-95): 100%|██████████| 5/5 [00:00<00:00,  9.74it/s]

                   all        132         97       0.56      0.201
0.288       0.17



      Epoch    GPU_mem   box_loss   cls_loss   dfl_loss  Instances
Size

      22/35      2.72G      1.036      2.431      1.325         40
640: 100%|██████████| 29/29 [00:02<00:00, 11.16it/s]
                 Class     Images  Instances      Box(P          R
mAP50  mAP50-95): 100%|██████████| 5/5 [00:00<00:00,  9.97it/s]

                   all        132         97      0.687      0.188
0.278      0.142



      Epoch    GPU_mem   box_loss   cls_loss   dfl_loss  Instances
Size

      23/35      2.72G      1.036      2.449      1.323         23
640: 100%|██████████| 29/29 [00:02<00:00, 11.33it/s]
                 Class     Images  Instances      Box(P          R
mAP50  mAP50-95): 100%|██████████| 5/5 [00:00<00:00,  9.83it/s]

                   all        132         97        0.7     0.0993
0.124      0.094
```

```
      Epoch    GPU_mem   box_loss   cls_loss   dfl_loss  Instances
Size

      24/35      2.72G     0.9994      2.436      1.316         21
640: 100%|██████████| 29/29 [00:02<00:00, 11.28it/s]
                 Class     Images  Instances      Box(P          R
mAP50  mAP50-95): 100%|██████████| 5/5 [00:00<00:00,  9.77it/s]

                   all        132         97      0.748      0.143
0.157      0.113



      Epoch    GPU_mem   box_loss   cls_loss   dfl_loss  Instances
Size

      25/35      2.72G     0.9817      2.269        1.3         18
640: 100%|██████████| 29/29 [00:02<00:00, 10.93it/s]
                 Class     Images  Instances      Box(P          R
mAP50  mAP50-95): 100%|██████████| 5/5 [00:00<00:00, 10.31it/s]

                   all        132         97      0.698      0.173
0.209      0.126


Closing dataloader mosaic
albumentations: Blur(p=0.01, blur_limit=(3, 7)), MedianBlur(p=0.01,
blur_limit=(3, 7)), ToGray(p=0.01, method='weighted_average',
num_output_channels=3), CLAHE(p=0.01, clip_limit=(1.0, 4.0),
tile_grid_size=(8, 8))

      Epoch    GPU_mem   box_loss   cls_loss   dfl_loss  Instances
Size

      26/35      2.72G      1.056      2.878      1.468         13
640: 100%|██████████| 29/29 [00:03<00:00,  8.95it/s]
                 Class     Images  Instances      Box(P          R
mAP50  mAP50-95): 100%|██████████| 5/5 [00:00<00:00, 10.10it/s]

                   all        132         97      0.723      0.179
0.137        0.1



      Epoch    GPU_mem   box_loss   cls_loss   dfl_loss  Instances
Size
```

```
      27/35      2.72G      1.028      2.795      1.464         22
640: 100%|██████████| 29/29 [00:02<00:00, 11.71it/s]
                 Class     Images  Instances      Box(P          R
mAP50  mAP50-95): 100%|██████████| 5/5 [00:00<00:00, 10.14it/s]

                   all        132         97      0.774      0.178
0.195       0.12



      Epoch    GPU_mem   box_loss   cls_loss   dfl_loss  Instances
Size

      28/35      2.72G     0.9943      2.718      1.435         14
640: 100%|██████████| 29/29 [00:02<00:00, 11.53it/s]
                 Class     Images  Instances      Box(P          R
mAP50  mAP50-95): 100%|██████████| 5/5 [00:00<00:00,  9.75it/s]

                   all        132         97      0.569      0.191
0.206      0.115



      Epoch    GPU_mem   box_loss   cls_loss   dfl_loss  Instances
Size

      29/35      2.72G     0.9779      2.648      1.433         13
640: 100%|██████████| 29/29 [00:02<00:00, 11.44it/s]
                 Class     Images  Instances      Box(P          R
mAP50  mAP50-95): 100%|██████████| 5/5 [00:00<00:00,  9.82it/s]

                   all        132         97        0.6      0.191
0.19      0.125



      Epoch    GPU_mem   box_loss   cls_loss   dfl_loss  Instances
Size

      30/35      2.72G     0.9476      2.547      1.382         11
640: 100%|██████████| 29/29 [00:02<00:00, 11.51it/s]
                 Class     Images  Instances      Box(P          R
mAP50  mAP50-95): 100%|██████████| 5/5 [00:00<00:00, 10.00it/s]

                   all        132         97      0.434      0.237
0.157      0.102

      Epoch    GPU_mem   box_loss   cls_loss   dfl_loss  Instances
Size
```

```
      31/35      2.72G       0.93      2.505      1.387          10
640: 100%|██████████| 29/29 [00:02<00:00, 11.81it/s]
                 Class     Images  Instances      Box(P          R
mAP50  mAP50-95): 100%|██████████| 5/5 [00:00<00:00, 10.30it/s]

                   all        132         97      0.579      0.156
0.172      0.105



      Epoch    GPU_mem   box_loss   cls_loss   dfl_loss  Instances
Size

      32/35      2.72G     0.8873      2.423      1.347          12
640: 100%|██████████| 29/29 [00:02<00:00, 11.34it/s]
                 Class     Images  Instances      Box(P          R
mAP50  mAP50-95): 100%|██████████| 5/5 [00:00<00:00,  9.99it/s]

                   all        132         97      0.712        0.2
0.16      0.104



      Epoch    GPU_mem   box_loss   cls_loss   dfl_loss  Instances
Size

      33/35      2.72G     0.8818      2.312      1.306          11
640: 100%|██████████| 29/29 [00:02<00:00, 11.47it/s]
                 Class     Images  Instances      Box(P          R
mAP50  mAP50-95): 100%|██████████| 5/5 [00:00<00:00, 10.05it/s]

                   all        132         97       0.77      0.125
0.17      0.113



      Epoch    GPU_mem   box_loss   cls_loss   dfl_loss  Instances
Size

      34/35      2.72G     0.8638      2.359      1.296          10
640: 100%|██████████| 29/29 [00:02<00:00, 11.47it/s]
                 Class     Images  Instances      Box(P          R
mAP50  mAP50-95): 100%|██████████| 5/5 [00:00<00:00, 10.23it/s]

                   all        132         97      0.562      0.159
0.188      0.118
```

```
      Epoch    GPU_mem   box_loss   cls_loss   dfl_loss  Instances
Size

      35/35      2.72G     0.8545      2.293      1.315          8
640: 100%|██████████| 29/29 [00:02<00:00, 11.75it/s]
                 Class     Images  Instances      Box(P          R
mAP50  mAP50-95): 100%|██████████| 5/5 [00:00<00:00, 10.01it/s]

                   all        132         97      0.547      0.221
0.172      0.114



35 epochs completed in 0.034 hours.
Optimizer stripped from runs/detect/train6/weights/last.pt, 6.3MB
Optimizer stripped from runs/detect/train6/weights/best.pt, 6.3MB

Validating runs/detect/train6/weights/best.pt...
Ultralytics 8.3.161 □ Python-3.11.13 torch-2.6.0+cu124 CUDA:0 (NVIDIA
A100-SXM4-40GB, 40507MiB)
Model summary (fused): 72 layers, 3,007,793 parameters, 0 gradients,
8.1 GFLOPs

                 Class     Images  Instances      Box(P          R
mAP50  mAP50-95): 100%|██████████| 5/5 [00:01<00:00,  4.41it/s]

                   all        132         97      0.562      0.204
0.286       0.17
                  Bags         20         23      0.298      0.696
0.549      0.434
               Bicycle         40         42      0.326      0.564
0.296      0.221
               Clothes         14         18          0          0
0.0169    0.00769
               Textile          6          6       0.31      0.167
0.136     0.0932
                 Lamps          5          5          1          0
0.00732    0.00372
       Office_Supplies          1          1          1          0
0.995      0.428
            Spare_Part          1          2          1          0
0          0
Speed: 0.1ms preprocess, 2.0ms inference, 0.0ms loss, 1.8ms
postprocess per image
Results saved to runs/detect/train6

====================================================
TRAINING COMPLETED!
Best model saved in folder: runs/detect/train6
```

```
Model file to be used for API is 'best.pt'
==========================================================

!mkdir -p /content/drive/MyDrive/My_AI_Models


!cp /content/runs/detect/train/weights/best.pt
/content/drive/MyDrive/My_AI_Models/xray_cargo_items.pt

print("File 'xray_cargo_items.pt' saved on 'My_AI_Models'!")
```

```
File 'xray_cargo_items.pt' saved on 'My_AI_Models'!
```