

🔍 Introduction to YOLO (You Only Look Once)

This notebook gives you a short intro to YOLO object detection and shows you how to run a pretrained YOLO model in Google Colab.

YOLO does 3 things at once:

1. Divide the image into a grid (e.g., 80×80).
2. For each grid cell, predict: bounding box location objectness (is there an object?) class probabilities
3. Use Non-Maximum Suppression (NMS) to remove duplicate boxes.

Why YOLO is fast: No sliding window No region proposal network One pass → real-time inference

🚀 Install Ultralytics YOLO

For installation you only need the following line

```
!pip install ultralytics
```

📦 Import and Load YOLOv11

There are many versions of YOLO the latest version of YOLO which is a CNN is YOLOv11. YOLOv12 has switched to using a different method which is no longer a CNN.

For the Project DO NOT use Version 12

```
from ultralytics import YOLO
model = YOLO('yolov11n.pt') # nano model for speed, options are n,s,m,l,x
```

🧠 Training Your Own YOLO Model

You will need to provide the path to your dataset. The documentation has a list of all the available metrics which may or may not be useful to you while training

<https://docs.ultralytics.com/modes/train/#train-settings>

```
# Example command for training (replace with your dataset)
model.train(data='your_dataset.yaml', epochs=50, imgsz=640)
```

📁 Saved Results

All your training plots and final model weights are saved to a folder runs/detect/train

With multiple training sessions the detect folder will have multiple train folders named sequentially.

runs/

```
detect/
  train1
  train2
```

🖼️ Run Inference on an Image

How to use the model for detecting objects in more detail:

<https://docs.ultralytics.com/modes/predict/#key-features-of-predict-mode>

```
# Sample image
!wget -q https://ultralytics.com/images/bus.jpg -O bus.jpg
results = model('bus.jpg')
results[0].show()
```

Project 3 Report

You are required to provide reasoning and explanations of your process and results. The report for project 3 should be well polished, with nice formatting. Please include your results, test images should be included in the report.