Introduction

This notebook was written in Google Colab. We used their GPU-time to train, evaluate and test our model.

This project was made by myself (Marinus v/d Ende & Matthijs Prinsen)

Custom packages (Dependecies)

Since we curated our dataset on Roboflow, we need to pip install it first.

```
!pip install roboflow
```

Show hidden output

Initialization

Then we get to import os for directory handling, and torch for training.

CUDA is for GPU utilization during training. We will want this minimise training time.

We used Google's T4 GPU with 15GB of VRAM.

```
import os
import torch

if torch.cuda.is_available():
    print("CUDA is available! 🎉")
    print(f"CUDA version: {torch.version.cuda}")
    print(f"Number of GPUs: {torch.cuda.device_count()}")
else:
    print("CUDA is not available. 😞")

!nvidia-smi
```

```
CUDA is not available. 😞
/bin/bash: line 1: nvidia-smi: command not found
```

You need to select a GPU on runtime in order to use CUDA.

Clone YOLOv7

Next, we can clone the YOLOv7 repository and install dependencies.

```
# Download YOLOv7 repository and install requirements
if not os.path.isdir("yolov7"):
    !git clone https://github.com/WongKinYiu/yolov7
%cd yolov7
!pip install -r requirements.txt
```

Show hidden output

Dataset from Roboflow

Since we curated our datasets on Roboflow, we can programically import and extract the data in the right format for the YOLO model.

This model requires a custom .yalm file with information about classes and the direcotries for the train, validation and test sets.

```
from roboflow import Roboflow
rf = Roboflow(api_key="bpTnKg4hhE85Oz3oxOFg")
project = rf.workspace("endexspace").project("supermarket-items-yolov7")
version = project.version(2)
dataset = version.download("yolov7")
```

```
loading Roboflow workspace...
loading Roboflow project...
Downloading Dataset Version Zip in Supermarket-Items-(YOLOv7)-2 to yolov7pytorch:: 100%|[redacted]| 419317/419317 [00:08<00:00, 521

Extracting Dataset Version Zip to Supermarket-Items-(YOLOv7)-2 in yolov7pytorch:: 100%|[redacted]| 8264/8264 [00:06<00:00, 1321.50i
```

Preparing model for training

Now that we have:

1. Initialized our environment and enabled GPU usage,
2. Cloned the model we want to use (YOLOv7)
3. Downloaded our dataset from Roboflow

We can get the starting weights for the tiny YOLOv7 model.

```
# Download the Tiny model weights.
!wget https://github.com/WongKinYiu/yolov7/releases/download/v0.1/yolov7-tiny.pt
```

Show hidden output

Since we are using the tiny YOLOv7 model we are going to create our own configuration file for the model architecture.

All we're really changing is the class count. Originally it had a class count of 80, we are changing that to 31

```
%%writefile yolov7/cfg/training/yolov7_grocery-tiny.yaml
# parameters
nc: 31  # number of classes
depth_multiple: 1.0  # model depth multiple
width_multiple: 1.0  # layer channel multiple

# anchors
anchors:
  - [10,13, 16,30, 33,23]  # P3/8
  - [30,61, 62,45, 59,119]  # P4/16
  - [116,90, 156,198, 373,326]  # P5/32

# yolov7-tiny backbone
backbone:
  # [from, number, module, args] c2, k=1, s=1, p=None, g=1, act=True
  [[-1, 1, Conv, [32, 3, 2, None, 1, nn.LeakyReLU(0.1)]],  # 0-P1/2

  [-1, 1, Conv, [64, 3, 2, None, 1, nn.LeakyReLU(0.1)]],  # 1-P2/4

  [-1, 1, Conv, [32, 1, 1, None, 1, nn.LeakyReLU(0.1)]],
  [-2, 1, Conv, [32, 1, 1, None, 1, nn.LeakyReLU(0.1)]],
  [-1, 1, Conv, [32, 3, 1, None, 1, nn.LeakyReLU(0.1)]],
  [-1, 1, Conv, [32, 3, 1, None, 1, nn.LeakyReLU(0.1)]],
  [[-1, -2, -3, -4], 1, Concat, [1]],
  [-1, 1, Conv, [64, 1, 1, None, 1, nn.LeakyReLU(0.1)]],  # 7

  [-1, 1, MP, []],  # 8-P3/8
  [-1, 1, Conv, [64, 1, 1, None, 1, nn.LeakyReLU(0.1)]],
  [-2, 1, Conv, [64, 1, 1, None, 1, nn.LeakyReLU(0.1)]],
  [-1, 1, Conv, [64, 3, 1, None, 1, nn.LeakyReLU(0.1)]],
  [-1, 1, Conv, [64, 3, 1, None, 1, nn.LeakyReLU(0.1)]],
  [[-1, -2, -3, -4], 1, Concat, [1]],
  [-1, 1, Conv, [128, 1, 1, None, 1, nn.LeakyReLU(0.1)]],  # 14

  [-1, 1, MP, []],  # 15-P4/16
  [-1, 1, Conv, [128, 1, 1, None, 1, nn.LeakyReLU(0.1)]],
  [-2, 1, Conv, [128, 1, 1, None, 1, nn.LeakyReLU(0.1)]],
  [-1, 1, Conv, [128, 3, 1, None, 1, nn.LeakyReLU(0.1)]],
  [-1, 1, Conv, [128, 3, 1, None, 1, nn.LeakyReLU(0.1)]],
  [[-1, -2, -3, -4], 1, Concat, [1]],
  [-1, 1, Conv, [256, 1, 1, None, 1, nn.LeakyReLU(0.1)]],  # 21

  [-1, 1, MP, []],  # 22-P5/32
  [-1, 1, Conv, [256, 1, 1, None, 1, nn.LeakyReLU(0.1)]],
  [-2, 1, Conv, [256, 1, 1, None, 1, nn.LeakyReLU(0.1)]],
  [-1, 1, Conv, [256, 3, 1, None, 1, nn.LeakyReLU(0.1)]],
  [-1, 1, Conv, [256, 3, 1, None, 1, nn.LeakyReLU(0.1)]],
  [[-1, -2, -3, -4], 1, Concat, [1]],
  [-1, 1, Conv, [512, 1, 1, None, 1, nn.LeakyReLU(0.1)]],  # 28
  ]

# yolov7-tiny head
head:
  [[-1, 1, Conv, [256, 1, 1, None, 1, nn.LeakyReLU(0.1)]],
  [-2, 1, Conv, [256, 1, 1, None, 1, nn.LeakyReLU(0.1)]],
  [-1, 1, SP, [5]],
  [-2, 1, SP, [9]],
```

```
  [-3, 1, SP, [13]],
  [[-1, -2, -3, -4], 1, Concat, [1]],
  [-1, 1, Conv, [256, 1, 1, None, 1, nn.LeakyReLU(0.1)]],
  [[-1, -7], 1, Concat, [1]],
  [-1, 1, Conv, [256, 1, 1, None, 1, nn.LeakyReLU(0.1)]],  # 37

  [-1, 1, Conv, [128, 1, 1, None, 1, nn.LeakyReLU(0.1)]],
  [-1, 1, nn.Upsample, [None, 2, 'nearest']],
  [21, 1, Conv, [128, 1, 1, None, 1, nn.LeakyReLU(0.1)]], # route backbone P4
  [[-1, -2], 1, Concat, [1]],

  [-1, 1, Conv, [64, 1, 1, None, 1, nn.LeakyReLU(0.1)]],
  [-2, 1, Conv, [64, 1, 1, None, 1, nn.LeakyReLU(0.1)]],
  [-1, 1, Conv, [64, 3, 1, None, 1, nn.LeakyReLU(0.1)]],
  [-1, 1, Conv, [64, 3, 1, None, 1, nn.LeakyReLU(0.1)]],
  [[-1, -2, -3, -4], 1, Concat, [1]],
  [-1, 1, Conv, [128, 1, 1, None, 1, nn.LeakyReLU(0.1)]],  # 47

  [-1, 1, Conv, [64, 1, 1, None, 1, nn.LeakyReLU(0.1)]],
  [-1, 1, nn.Upsample, [None, 2, 'nearest']],
  [14, 1, Conv, [64, 1, 1, None, 1, nn.LeakyReLU(0.1)]], # route backbone P3
  [[-1, -2], 1, Concat, [1]],

  [-1, 1, Conv, [32, 1, 1, None, 1, nn.LeakyReLU(0.1)]],
  [-2, 1, Conv, [32, 1, 1, None, 1, nn.LeakyReLU(0.1)]],
  [-1, 1, Conv, [32, 3, 1, None, 1, nn.LeakyReLU(0.1)]],
  [-1, 1, Conv, [32, 3, 1, None, 1, nn.LeakyReLU(0.1)]],
  [[-1, -2, -3, -4], 1, Concat, [1]],
  [-1, 1, Conv, [64, 1, 1, None, 1, nn.LeakyReLU(0.1)]],  # 57

  [-1, 1, Conv, [128, 3, 2, None, 1, nn.LeakyReLU(0.1)]],
  [[-1, 47], 1, Concat, [1]],

  [-1, 1, Conv, [64, 1, 1, None, 1, nn.LeakyReLU(0.1)]],
  [-2, 1, Conv, [64, 1, 1, None, 1, nn.LeakyReLU(0.1)]],
  [-1, 1, Conv, [64, 3, 1, None, 1, nn.LeakyReLU(0.1)]],
  [-1, 1, Conv, [64, 3, 1, None, 1, nn.LeakyReLU(0.1)]],
  [[-1, -2, -3, -4], 1, Concat, [1]],
  [-1, 1, Conv, [128, 1, 1, None, 1, nn.LeakyReLU(0.1)]],  # 65

  [-1, 1, Conv, [256, 3, 2, None, 1, nn.LeakyReLU(0.1)]],
  [[-1, 37], 1, Concat, [1]],

  [-1, 1, Conv, [128, 1, 1, None, 1, nn.LeakyReLU(0.1)]],
  [-2, 1, Conv, [128, 1, 1, None, 1, nn.LeakyReLU(0.1)]],
  [-1, 1, Conv, [128, 3, 1, None, 1, nn.LeakyReLU(0.1)]],
  [-1, 1, Conv, [128, 3, 1, None, 1, nn.LeakyReLU(0.1)]],
  [[-1, -2, -3, -4], 1, Concat, [1]],
  [-1, 1, Conv, [256, 1, 1, None, 1, nn.LeakyReLU(0.1)]],  # 73

  [57, 1, Conv, [128, 3, 1, None, 1, nn.LeakyReLU(0.1)]],
  [65, 1, Conv, [256, 3, 1, None, 1, nn.LeakyReLU(0.1)]],
  [73, 1, Conv, [512, 3, 1, None, 1, nn.LeakyReLU(0.1)]],

  [[74,75,76], 1, IDetect, [nc, anchors]],   # Detect(P3, P4, P5)
  ]
```

```
Writing yolov7/cfg/training/yolov7_grocery-tiny.yaml
```

Training

We can now start with the training.

```
dataset_location: str = dataset.location
loc: str = f"\"{dataset_location}/data.yaml\""
print(loc)

!python yolov7/train.py --epochs 50 --workers 8 --device 0 --batch-size 32 \
--data {loc} --img 640 640 --cfg yolov7/cfg/training/yolov7_grocery-tiny.yaml \
--weights 'yolov7-tiny.pt' --name yolov7_tiny_grocery_fixed_res --hyp yolov7/data/hyp.scratch.tiny.yaml
```

```
 61                -2  1     16512  models.common.Conv                      [256, 64, 1, 1, None, 1, LeakyReLU(negative_slope=0.1
 62                -1  1     36992  models.common.Conv                      [64, 64, 3, 1, None, 1, LeakyReLU(negative_slope=0.1)
 63                -1  1     36992  models.common.Conv                      [64, 64, 3, 1, None, 1, LeakyReLU(negative_slope=0.1)
 64  [-1, -2, -3, -4]  1         0  models.common.Concat                    [1]
 65                -1  1     33024  models.common.Conv                      [256, 128, 1, 1, None, 1, LeakyReLU(negative_slope=0.
 66                -1  1    295424  models.common.Conv                      [128, 256, 3, 2, None, 1, LeakyReLU(negative_slope=0.
 67          [-1, 37]  1         0  models.common.Concat                    [1]
 68                -1  1     65792  models.common.Conv                      [512, 128, 1, 1, None, 1, LeakyReLU(negative_slope=0.
 69                -2  1     65792  models.common.Conv                      [512, 128, 1, 1, None, 1, LeakyReLU(negative_slope=0.
 70                -1  1    147712  models.common.Conv                      [128, 128, 3, 1, None, 1, LeakyReLU(negative_slope=0.
 71                -1  1    147712  models.common.Conv                      [128, 128, 3, 1, None, 1, LeakyReLU(negative_slope=0.
 72  [-1, -2, -3, -4]  1         0  models.common.Concat                    [1]
 73                -1  1    131584  models.common.Conv                      [512, 256, 1, 1, None, 1, LeakyReLU(negative_slope=0.
 74                57  1     73984  models.common.Conv                      [64, 128, 3, 1, None, 1, LeakyReLU(negative_slope=0.1
 75                65  1    295424  models.common.Conv                      [128, 256, 3, 1, None, 1, LeakyReLU(negative_slope=0.
 76                73  1   1180672  models.common.Conv                      [256, 512, 3, 1, None, 1, LeakyReLU(negative_slope=0.
 77      [74, 75, 76]  1     95606  models.yolo.IDetect                     [30, [[10, 13, 16, 30, 33, 23], [30, 61, 62, 45, 59,
/usr/local/lib/python3.11/dist-packages/torch/functional.py:534: UserWarning: torch.meshgrid: in an upcoming release, it will be
  return _VF.meshgrid(tensors, **kwargs)  # type: ignore[attr-defined]
Model Summary: 263 layers, 6093462 parameters, 6093462 gradients, 13.4 GFLOPS

Transferred 330/344 items from yolov7-tiny.pt
Scaled weight_decay = 0.0005
Optimizer groups: 58 .bias, 58 conv.weight, 61 other
train: Scanning 'Supermarket-Items-(YOLOv7)-2/train/labels' images and labels... 3645 found, 0 missing, 0 empty, 0 corrupted: 100
train: New cache created: Supermarket-Items-(YOLOv7)-2/train/labels.cache
val: Scanning 'Supermarket-Items-(YOLOv7)-2/valid/labels' images and labels... 324 found, 0 missing, 0 empty, 0 corrupted: 100% 3
val: New cache created: Supermarket-Items-(YOLOv7)-2/valid/labels.cache

autoanchor: Analyzing anchors... anchors/target = 5.12, Best Possible Recall (BPR) = 1.0000
/content/yolov7/train.py:299: FutureWarning: `torch.cuda.amp.GradScaler(args...)` is deprecated. Please use `torch.amp.GradScaler
  scaler = amp.GradScaler(enabled=cuda)
Image sizes 640 train, 640 test
Using 2 dataloader workers
Logging results to runs/train/yolov7_tiny_grocery_fixed_res
Starting training for 50 epochs...

     Epoch   gpu_mem       box       obj       cls     total    labels  img_size
  0% 0/114 [00:00<?, ?it/s]/content/yolov7/train.py:360: FutureWarning: `torch.cuda.amp.autocast(args...)` is deprecated. Please
  with amp.autocast(enabled=cuda):
      0/49      1.4G   0.06751   0.04262   0.08366    0.1938       305       640: 100% 114/114 [02:35<00:00,  1.36s/it]
                 Class     Images     Labels          P          R     mAP@.5  mAP@.5:.95: 100% 6/6 [00:08<00:00,  1.37s/it]
                   all        324       1867       0.06      0.209     0.0689     0.0265

     Epoch   gpu_mem       box       obj       cls     total    labels  img_size
      1/49     5.82G   0.04783   0.05099   0.07148    0.1703       283       640: 100% 114/114 [02:19<00:00,  1.22s/it]
                 Class     Images     Labels          P          R     mAP@.5  mAP@.5:.95: 100% 6/6 [00:04<00:00,  1.24it/s]
                   all        324       1867      0.381      0.277      0.205     0.0801
```

We were averaging around 1.2 seconds per iteration and I wanted to try and optimise that.

I therefore stopped the training and adjusted the batch-size and workers to try and find an optimal combination of settings to utilize as much of the resources in colab as possible.

```
!python yolov7/train.py \
  --resume \
  --batch-size 64 \
  --workers 8
```

```
2025-01-27 20:43:38.083653: E external/local_xla/xla/stream_executor/cuda/cuda_fft.cc:485] Unable to register cuFFT factory: Atte
2025-01-27 20:43:38.103241: E external/local_xla/xla/stream_executor/cuda/cuda_dnn.cc:8454] Unable to register cuDNN factory: Att
2025-01-27 20:43:38.109266: E external/local_xla/xla/stream_executor/cuda/cuda_blas.cc:1452] Unable to register cuBLAS factory: A
2025-01-27 20:43:38.123405: I tensorflow/core/platform/cpu_feature_guard.cc:210] This TensorFlow binary is optimized to use avail
To enable the following instructions: AVX2 AVX512F FMA, in other operations, rebuild TensorFlow with the appropriate compiler fla
2025-01-27 20:43:39.195652: W tensorflow/compiler/tf2tensorrt/utils/py_utils.cc:38] TF-TRT Warning: Could not find TensorRT
Resuming training from ./runs/train/yolov7_tiny_grocery_fixed_res/weights/last.pt
YOLOR 🚀 v0.1-128-ga207844 torch 2.5.1+cu121 CUDA:0 (Tesla T4, 15102.0625MB)

Namespace(weights='./runs/train/yolov7_tiny_grocery_fixed_res/weights/last.pt', cfg='', data='/content/Supermarket-Items-(YOLOv7)
tensorboard: Start with 'tensorboard --logdir runs/train', view at http://localhost:6006/
hyperparameters: lr0=0.01, lrf=0.01, momentum=0.937, weight_decay=0.0005, warmup_epochs=3.0, warmup_momentum=0.8, warmup_bias_lr=
/content/yolov7/train.py:71: FutureWarning: You are using `torch.load` with `weights_only=False` (the current default value), whi
  run_id = torch.load(weights, map_location=device).get('wandb_id') if weights.endswith('.pt') and os.path.isfile(weights) else N
wandb: Currently logged in as: endex-space (endex-space-university-of-groningen). Use `wandb login --relogin` to force relogin
wandb: Using wandb-core as the SDK backend.  Please refer to https://wandb.me/wandb-core for more information.
wandb: Tracking run with wandb version 0.19.4
wandb: Run data is saved locally in /content/wandb/run-20250127_204344-vqer9kz6
wandb: Run `wandb offline` to turn off syncing.
wandb: Resuming run yolov7_tiny_grocery_fixed_res
wandb: ⭐ View project at https://wandb.ai/endex-space-university-of-groningen/YOLOR
wandb: 🚀 View run at https://wandb.ai/endex-space-university-of-groningen/YOLOR/runs/vqer9kz6
/content/yolov7/train.py:87: FutureWarning: You are using `torch.load` with `weights_only=False` (the current default value), whi
  ckpt = torch.load(weights, map_location=device)  # load checkpoint

                 from  n    params  module                                  arguments
  0                -1  1       928  models.common.Conv                      [3, 32, 3, 2, None, 1, LeakyReLU(negative_slope=0.1)]
  1                -1  1     18560  models.common.Conv                      [32, 64, 3, 2, None, 1, LeakyReLU(negative_slope=0.1)
```

```
  2                -1  1      2112  models.common.Conv                      [64, 32, 1, 1, None, 1, LeakyReLU(negative_slope=0.1)
  3                -2  1      2112  models.common.Conv                      [64, 32, 1, 1, None, 1, LeakyReLU(negative_slope=0.1)
  4                -1  1      9280  models.common.Conv                      [32, 32, 3, 1, None, 1, LeakyReLU(negative_slope=0.1)
  5                -1  1      9280  models.common.Conv                      [32, 32, 3, 1, None, 1, LeakyReLU(negative_slope=0.1)
  6  [-1, -2, -3, -4]  1         0  models.common.Concat                    [1]
  7                -1  1      8320  models.common.Conv                      [128, 64, 1, 1, None, 1, LeakyReLU(negative_slope=0.1
  8                -1  1         0  models.common.MP                        []
  9                -1  1      4224  models.common.Conv                      [64, 64, 1, 1, None, 1, LeakyReLU(negative_slope=0.1)
 10                -2  1      4224  models.common.Conv                      [64, 64, 1, 1, None, 1, LeakyReLU(negative_slope=0.1)
 11                -1  1     36992  models.common.Conv                      [64, 64, 3, 1, None, 1, LeakyReLU(negative_slope=0.1)
 12                -1  1     36992  models.common.Conv                      [64, 64, 3, 1, None, 1, LeakyReLU(negative_slope=0.1)
 13  [-1, -2, -3, -4]  1         0  models.common.Concat                    [1]
 14                -1  1     33024  models.common.Conv                      [256, 128, 1, 1, None, 1, LeakyReLU(negative_slope=0.
 15                -1  1         0  models.common.MP                        []
 16                -1  1     16640  models.common.Conv                      [128, 128, 1, 1, None, 1, LeakyReLU(negative_slope=0.
 17                -2  1     16640  models.common.Conv                      [128, 128, 1, 1, None, 1, LeakyReLU(negative_slope=0.
 18                -1  1    147712  models.common.Conv                      [128, 128, 3, 1, None, 1, LeakyReLU(negative_slope=0.
 19                -1  1    147712  models.common.Conv                      [128, 128, 3, 1, None, 1, LeakyReLU(negative_slope=0.
 20  [-1, -2, -3, -4]  1         0  models.common.Concat                    [1]
 21                -1  1    131584  models.common.Conv                      [512, 256, 1, 1, None, 1, LeakyReLU(negative_slope=0.
 22                -1  1         0  models.common.MP                        []
 23                -1  1     66048  models.common.Conv                      [256, 256, 1, 1, None, 1, LeakyReLU(negative_slope=0.
 24                -2  1     66048  models.common.Conv                      [256, 256, 1, 1, None, 1, LeakyReLU(negative_slope=0.
 25                -1  1    590336  models.common.Conv                      [256, 256, 3, 1, None, 1, LeakyReLU(negative_slope=0.
 26                -1  1    590336  models.common.Conv                      [256, 256, 3, 1, None, 1, LeakyReLU(negative_slope=0.
 27  [-1, -2, -3, -4]  1         0  models.common.Concat                    [1]
 28                -1  1    525312  models.common.Conv                      [1024, 512, 1, 1, None, 1, LeakyReLU(negative_slope=0
 29                -1  1    131584  models.common.Conv                      [512, 256, 1, 1, None, 1, LeakyReLU(negative_slope=0.
```

Unfortunately, after some configuration I could not get the model to train faster than 1.2 s/it.

Testing the trained Model

Now that we have trained the model, and can view the beautiful convergence of the training curves we get to test our model.

```
dataset_location = dataset.location
loc: str = f"\"{dataset_location}/test/images\""
print(loc)

# Run evaluation
!python yolov7/detect.py \
  --weights best.pt \
  --conf 0.1 \
  --source {loc}
```

```
"/content/Supermarket-Items-(YOLOv7)-2/test/images"
Namespace(weights=['best.pt'], source='/content/Supermarket-Items-(YOLOv7)-2/test/images', img_size=640, conf_thres=0.1, iou_thres=0
YOLOR 🚀 v0.1-128-ga207844 torch 2.5.1+cu121 CPU

/content/yolov7/models/experimental.py:252: FutureWarning: You are using `torch.load` with `weights_only=False` (the current defaul
  ckpt = torch.load(w, map_location=map_location)  # load
Fusing layers...
IDetect.fuse
/usr/local/lib/python3.11/dist-packages/torch/functional.py:534: UserWarning: torch.meshgrid: in an upcoming release, it will be rec
  return _VF.meshgrid(tensors, **kwargs)  # type: ignore[attr-defined]
Model Summary: 208 layers, 6086070 parameters, 0 gradients, 13.3 GFLOPS
 Convert model to Traced-model...
 traced_script_module saved!
 model is traced!

2 bananas, 1 bread, Done. (397.1ms) Inference, (1.4ms) NMS
Traceback (most recent call last):
  File "/content/yolov7/detect.py", line 196, in <module>
    detect()
  File "/content/yolov7/detect.py", line 136, in detect
    cv2.imshow(str(p), im0)
cv2.error: OpenCV(4.10.0) /io/opencv/modules/highgui/src/window.cpp:1301: error: (-2:Unspecified error) The function is not implemer
```

Below is some simple code to print out our model's predictions on our testing data.

The model performed spectacularly with a mAP of 95% on our testing data. It can be seen that the model sometimes misses an image but it rarely mislabels objects.

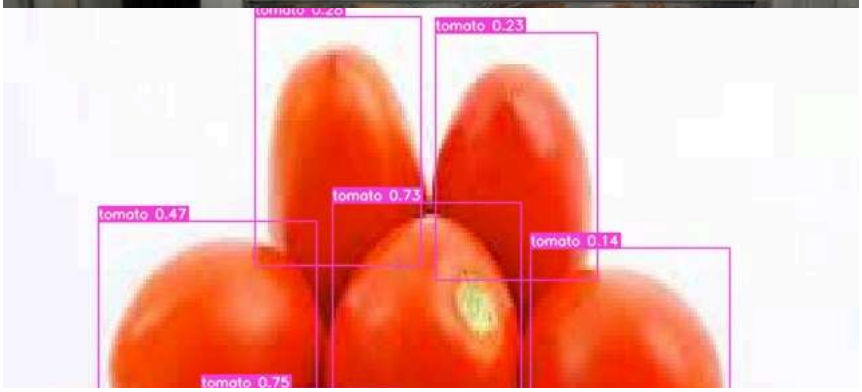
A success in our books.

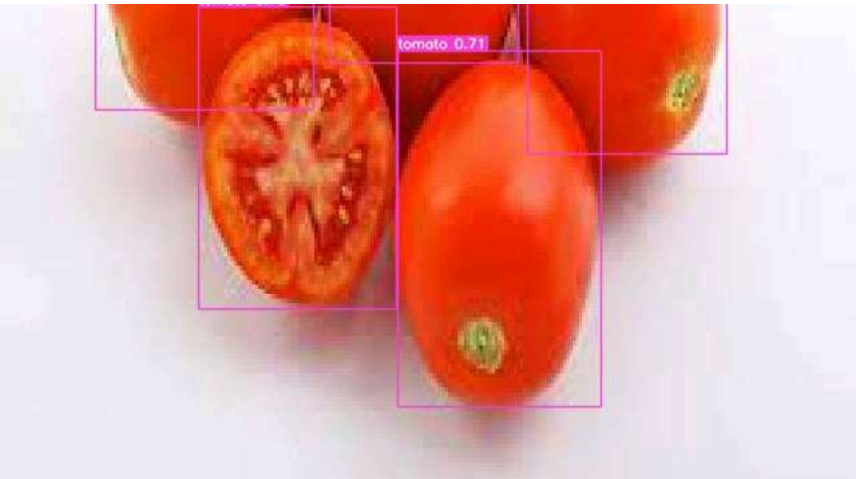
```
#display inference on ALL test images

import glob
from IPython.display import Image, display
```

```

i = 0
limit = 10000 # max images to print
for imageName in glob.glob('/content/runs/detect/exp2/*.jpg'): #assuming JPG
    if i < limit:
      display(Image(filename=imageName))
      print("\n")
    i = i + 1
```


bread 0.53


milk 0.93
potato 0.93
eggs 0.91
flour 0.90
blueberries 0.89
corn 0.93
butter 0.95
chicken_breast 0.85
beef 0.82
chicken 0.93


tomato 0.23
tomato 0.73
tomato 0.47
tomato 0.14
tomato 0.75

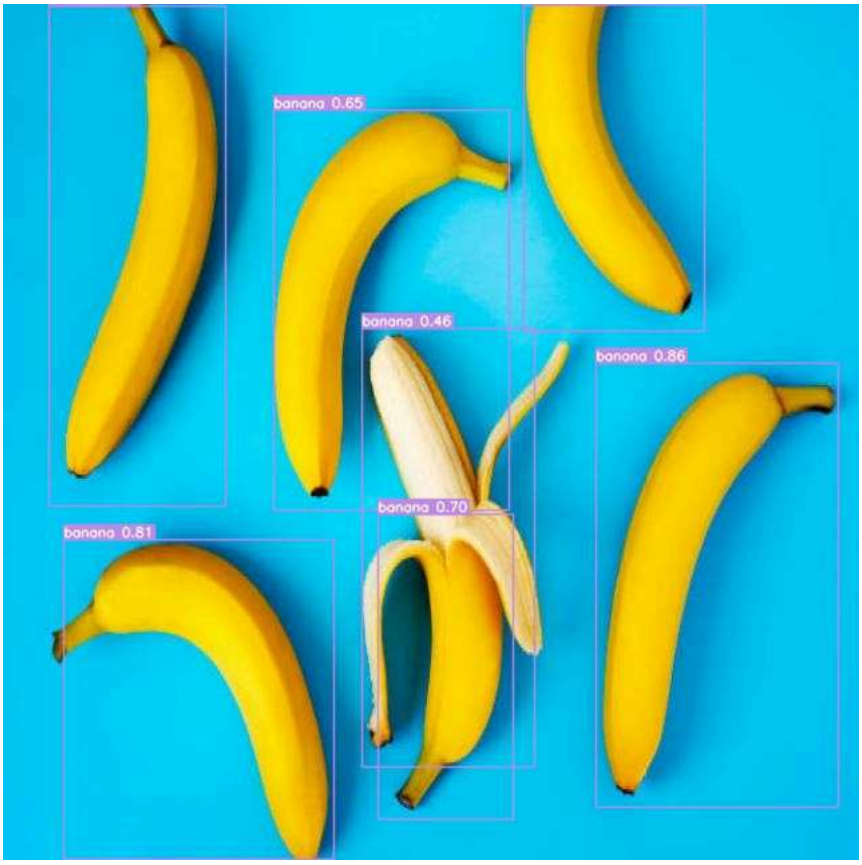

tomato 0.71

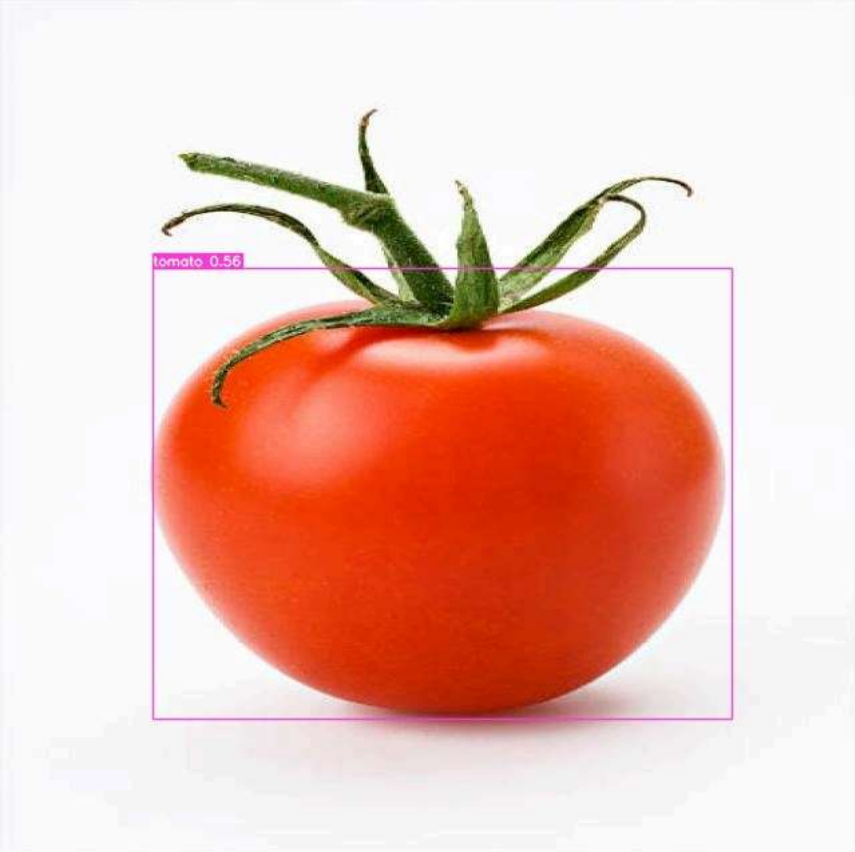

Fruit
bread


BRITANNIA
HEALTHY
SLICE
Soft & Thicker
Sandwich White Bread


milk 0.66
milk 0.73
milk 0.82


banana 0.40


banana 0.65
banana 0.46
banana 0.86
banana 0.70
banana 0.81

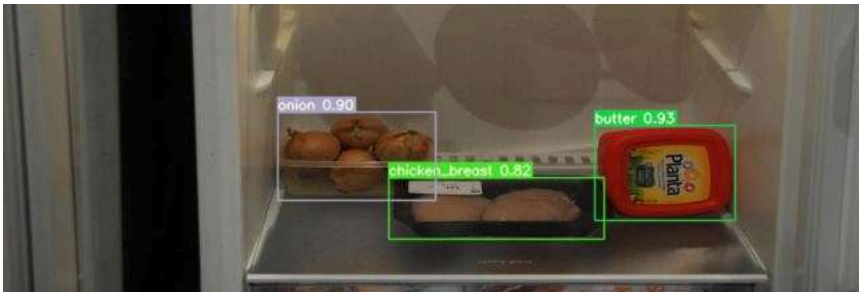

tomato 0.56


green_beans 0.93
cheese 0.91

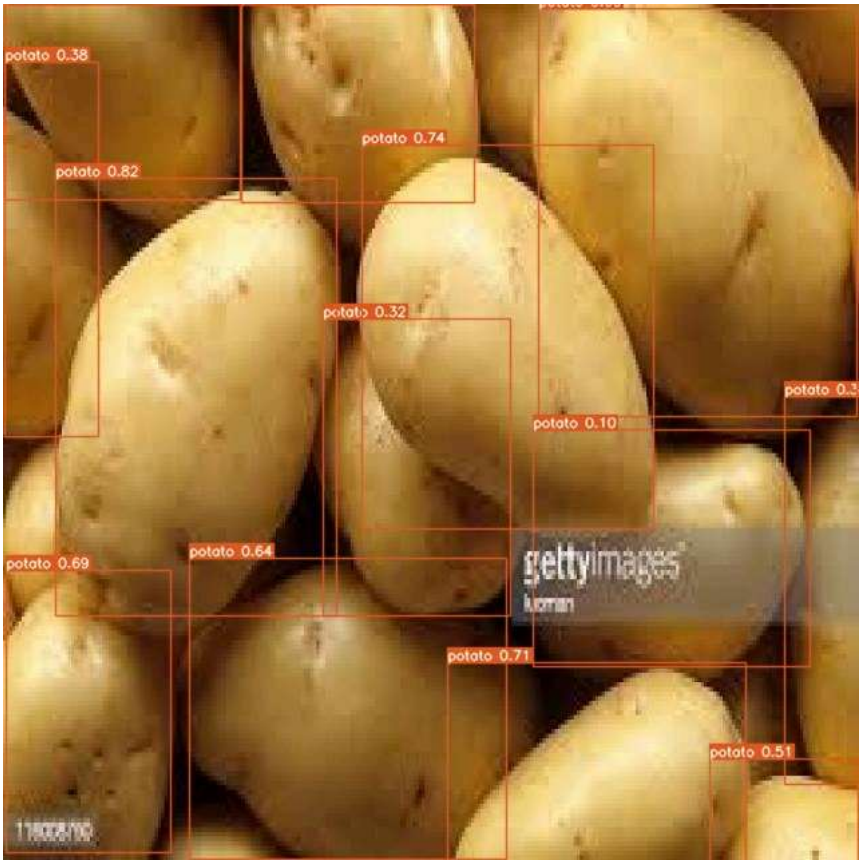

strawberries 0.90
eggs 0.93
flour 0.92
mushrooms 0.91
onion 0.92
milk 0.94
banana 0.92
bread 0.94


milk 0.89
bread 0.94
carrot 0.59
eggs 0.91
lime 0.29
chicken_breast 0.25
flour 0.86
chicken 0.90
beef 0.80
sugar 0.94


apple 0.92
chocolate 0.78
eggs 0.95
sugar 0.88
green_beans 0.84
bread 0.91
cheese 0.92
mushrooms 0.91


onion 0.90
butter 0.93
chicken_breast 0.82
Planta


BRITANNIA
VitaRICH
SANDWICH
Premium White Bread


potato 0.38
potato 0.74
potato 0.82
potato 0.32
potato 0.10
potato 0.64
potato 0.69
potato 0.71
potato 0.51
gettyimages