

```
## get models repo
```

```
!git clone https://github.com/sovit-123/fastercnn-pytorch-training-pipeline.git
```

```
%cd ..
```

```
!git clone https://github.com/sovit-123/vision_transformers.git
```

```
C:\Users\user\Desktop\py\2\rccnn3
```

```
fatal: destination path 'fastercnn-pytorch-training-pipeline' already exists and is not an empty directory.
```

```
fatal: destination path 'vision_transformers' already exists and is not an empty directory.
```

```
#YOLO
```

```
## instantiate the yoloModel with the trained weights on ASL alph
```

```
%cd C:\Users\user\Desktop\py\2\rccnn3
```

```
!git clone https://github.com/ultralytics/yolov5
```

```
%cd yolov5
```

```
!pip install -r requirements.txt
```

```
%cd ..
```

```
import torch
```

```
import yolov5.models.common
```

```
yoloModel = torch.hub.load('ultralytics/yolov5', 'custom',  
path='C:/Users/user/Desktop/pesosYolo.pt', force_reload=True)
```

```
C:\Users\user\Desktop\py\2\rccnn3
```

```
C:\Users\user\Desktop\py\2\rccnn3\yolov5
```

```
fatal: destination path 'yolov5' already exists and is not an empty directory.
```

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Requirement already satisfied: gitpython>=3.1.30 in c:\users\user\anaconda3\envs\trch\lib\site-packages (from -r requirements.txt (line 5)) (3.1.40)
```

```
Requirement already satisfied: matplotlib>=3.3 in c:\users\user\anaconda3\envs\trch\lib\site-packages (from -r requirements.txt (line 6)) (3.8.1)
```

```
Requirement already satisfied: numpy>=1.22.2 in c:\users\user\anaconda3\envs\trch\lib\site-packages (from -r requirements.txt (line 7)) (1.26.2)
```

```
Requirement already satisfied: opencv-python>=4.1.1 in c:\users\user\anaconda3\envs\trch\lib\site-packages (from -r requirements.txt (line 8)) (4.8.1.78)
```

```
Requirement already satisfied: Pillow>=10.0.1 in c:\users\user\anaconda3\envs\trch\lib\site-packages (from -r requirements.txt (line 9)) (10.0.1)
```

```
Requirement already satisfied: psutil in c:\users\user\anaconda3\envs\trch\lib\site-packages (from -r requirements.txt (line 10)) (5.9.0)
```

```
Requirement already satisfied: PyYAML>=5.3.1 in c:\users\user\anaconda3\envs\trch\lib\site-packages (from -r requirements.txt (line 11)) (6.0.1)
```

11)) (6.0.1)
Requirement already satisfied: requests>=2.23.0 in c:\users\user\anaconda3\envs\trch\lib\site-packages (from -r requirements.txt (line 12)) (2.31.0)
Requirement already satisfied: scipy>=1.4.1 in c:\users\user\anaconda3\envs\trch\lib\site-packages (from -r requirements.txt (line 13)) (1.11.3)
Requirement already satisfied: thop>=0.1.1 in c:\users\user\anaconda3\envs\trch\lib\site-packages (from -r requirements.txt (line 14)) (0.1.1.post2209072238)
Requirement already satisfied: torch>=1.8.0 in c:\users\user\anaconda3\envs\trch\lib\site-packages (from -r requirements.txt (line 15)) (2.1.1)
Requirement already satisfied: torchvision>=0.9.0 in c:\users\user\anaconda3\envs\trch\lib\site-packages (from -r requirements.txt (line 16)) (0.16.1)
Requirement already satisfied: tqdm>=4.64.0 in c:\users\user\anaconda3\envs\trch\lib\site-packages (from -r requirements.txt (line 17)) (4.66.1)
Requirement already satisfied: ultralytics>=8.0.147 in c:\users\user\anaconda3\envs\trch\lib\site-packages (from -r requirements.txt (line 18)) (8.0.211)
Requirement already satisfied: pandas>=1.1.4 in c:\users\user\anaconda3\envs\trch\lib\site-packages (from -r requirements.txt (line 27)) (2.1.3)
Requirement already satisfied: seaborn>=0.11.0 in c:\users\user\anaconda3\envs\trch\lib\site-packages (from -r requirements.txt (line 28)) (0.13.0)
Requirement already satisfied: setuptools>=65.5.1 in c:\users\user\anaconda3\envs\trch\lib\site-packages (from -r requirements.txt (line 42)) (68.0.0)
Requirement already satisfied: gitdb<5,>=4.0.1 in c:\users\user\anaconda3\envs\trch\lib\site-packages (from gitpython>=3.1.30->-r requirements.txt (line 5)) (4.0.11)
Requirement already satisfied: contourpy>=1.0.1 in c:\users\user\anaconda3\envs\trch\lib\site-packages (from matplotlib>=3.3->-r requirements.txt (line 6)) (1.2.0)
Requirement already satisfied: cycler>=0.10 in c:\users\user\anaconda3\envs\trch\lib\site-packages (from matplotlib>=3.3->-r requirements.txt (line 6)) (0.10.0)
Requirement already satisfied: fonttools>=4.22.0 in c:\users\user\anaconda3\envs\trch\lib\site-packages (from matplotlib>=3.3->-r requirements.txt (line 6)) (4.44.3)
Requirement already satisfied: kiwisolver>=1.3.1 in c:\users\user\anaconda3\envs\trch\lib\site-packages (from matplotlib>=3.3->-r requirements.txt (line 6)) (1.4.5)
Requirement already satisfied: packaging>=20.0 in c:\users\user\anaconda3\envs\trch\lib\site-packages (from matplotlib>=3.3->-r requirements.txt (line 6)) (23.1)

Requirement already satisfied: pyparsing>=2.3.1 in c:\users\user\anaconda3\envs\trch\lib\site-packages (from matplotlib>=3.3->-r requirements.txt (line 6)) (2.4.7)

Requirement already satisfied: python-dateutil>=2.7 in c:\users\user\anaconda3\envs\trch\lib\site-packages (from matplotlib>=3.3->-r requirements.txt (line 6)) (2.8.2)

Requirement already satisfied: charset-normalizer<4,>=2 in c:\users\user\anaconda3\envs\trch\lib\site-packages (from requests>=2.23.0->-r requirements.txt (line 12)) (3.3.2)

Requirement already satisfied: idna<4,>=2.5 in c:\users\user\anaconda3\envs\trch\lib\site-packages (from requests>=2.23.0->-r requirements.txt (line 12)) (2.10)

Requirement already satisfied: urllib3<3,>=1.21.1 in c:\users\user\anaconda3\envs\trch\lib\site-packages (from requests>=2.23.0->-r requirements.txt (line 12)) (2.1.0)

Requirement already satisfied: certifi>=2017.4.17 in c:\users\user\anaconda3\envs\trch\lib\site-packages (from requests>=2.23.0->-r requirements.txt (line 12)) (2023.7.22)

Requirement already satisfied: filelock in c:\users\user\anaconda3\envs\trch\lib\site-packages (from torch>=1.8.0->-r requirements.txt (line 15)) (3.13.1)

Requirement already satisfied: typing-extensions in c:\users\user\anaconda3\envs\trch\lib\site-packages (from torch>=1.8.0->-r requirements.txt (line 15)) (4.7.1)

Requirement already satisfied: sympy in c:\users\user\anaconda3\envs\trch\lib\site-packages (from torch>=1.8.0->-r requirements.txt (line 15)) (1.12)

Requirement already satisfied: networkx in c:\users\user\anaconda3\envs\trch\lib\site-packages (from torch>=1.8.0->-r requirements.txt (line 15)) (3.2.1)

Requirement already satisfied: jinja2 in c:\users\user\anaconda3\envs\trch\lib\site-packages (from torch>=1.8.0->-r requirements.txt (line 15)) (3.1.2)

Requirement already satisfied: fsspec in c:\users\user\anaconda3\envs\trch\lib\site-packages (from torch>=1.8.0->-r requirements.txt (line 15)) (2023.10.0)

Requirement already satisfied: colorama in c:\users\user\anaconda3\envs\trch\lib\site-packages (from tqdm>=4.64.0->-r requirements.txt (line 17)) (0.4.6)

Requirement already satisfied: py-cpuinfo in c:\users\user\anaconda3\envs\trch\lib\site-packages (from ultralytics>=8.0.147->-r requirements.txt (line 18)) (9.0.0)

Requirement already satisfied: pytz>=2020.1 in c:\users\user\anaconda3\envs\trch\lib\site-packages (from pandas>=1.1.4->-r requirements.txt (line 27)) (2023.3.post1)

Requirement already satisfied: tzdata>=2022.1 in c:\users\user\anaconda3\envs\trch\lib\site-packages (from pandas>=1.1.4->-r requirements.txt (line 27)) (2023.3)

Requirement already satisfied: six in c:\users\user\anaconda3\envs\

```
trch\lib\site-packages (from cyciler>=0.10->matplotlib>=3.3->-r
requirements.txt (line 6)) (1.16.0)
Requirement already satisfied: smmap<6,>=3.0.1 in c:\users\user\
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>gitpython>=3.1.30->-r requirements.txt (line 5)) (5.0.1)
Requirement already satisfied: MarkupSafe>=2.0 in c:\users\user\
anaconda3\envs\trch\lib\site-packages (from jinja2->torch>=1.8.0->-r
requirements.txt (line 15)) (2.1.1)
Requirement already satisfied: mpmath>=0.19 in c:\users\user\
anaconda3\envs\trch\lib\site-packages (from sympy->torch>=1.8.0->-r
requirements.txt (line 15)) (1.3.0)
C:\Users\user\Desktop\py\2\rccnn3
```

```
Downloading: "https://github.com/ultralytics/yolov5/zipball/master" to
C:\Users\user/.cache\torch\hub\master.zip
YOLOv5 2023-11-20 Python-3.11.5 torch-2.1.1 CPU
```

Fusing layers...

Model summary: 157 layers, 7080247 parameters, 0 gradients, 16.0
GFLOPs

Adding AutoShape...

```
## important stuff
```

```
import numpy as np
import cv2
import torch
import glob as glob
import os
import time
import argparse
import yaml
import matplotlib.pyplot as plt
```

```
from modelRcnn.models.create_fasterrcnn_model import create_model
from modelRcnn.utils.annotations import (
    inference_annotations, convert_detections
)
from modelRcnn.utils.general import set_infer_dir
from modelRcnn.utils.transforms import infer_transforms, resize
```

```
## RCNN MODEL
```

```
#Load checkpoint, and dataset info (nc,etc)
```

```
checkpoint =
torch.load("C:/Users/user/Desktop/py/2/rccnn3/rcnnMobileNet/last_model
.pth", map_location=torch.device('cpu'))
```

```
with open("C:/Users/user/Desktop/py/2/rcnn/custom_data.yaml") as file:
    data_configs = yaml.safe_load(file)
```

```

NUM_CLASSES = data_configs['NC']
CLASSES = data_configs['CLASSES']

## instantiate a rcnn model

build_model = create_model[checkpoint['model_name']]

# get model
from modelRcnn.models import fasterrcnn_mobilenetv3_large_fpn

model = fasterrcnn_mobilenetv3_large_fpn.create_model(26,
pretrained=True, coco_model=False)

#test

model.load_state_dict(checkpoint['model_state_dict'])
model.eval()

## rcnn for an individual img
import cv2


frame_height, frame_width, _ = orig_image.shape
image_resized = cv2.resize(orig_image, (500,500))

image = cv2.cvtColor(image_resized, cv2.COLOR_BGR2RGB)
image = infer_transforms(image)
image = torch.unsqueeze(image, 0)

outputs = model(image)

## print box on img if object detected

outputs = [{k: v.to('cpu')} for k, v in t.items()] for t in outputs]
COLORS = np.random.uniform(0, 255, size=(len(CLASSES), 3))
if len(outputs[0]['boxes']) != 0:
    draw_boxes, pred_classes, scores = convert_detections(
        outputs, 0.2, CLASSES, {'classes': None, 'track':False ,
'no_labels':False})
    orig_image = inference_annotations(
        draw_boxes,
        pred_classes,
        scores,
        CLASSES,
        COLORS,
        orig_image,
        image_resized,

```

```

        {'classes': None, 'track': False, 'no_labels': False}
    )

## real time stuff
import cv2
import numpy as np

font = cv2.FONT_HERSHEY_SIMPLEX
countYolo = 0
countRcnn = 0

pointsYolo = 0
pointsRcnn = 0

yoloPred = 'A'
prevYolo = 'A'
prevRcnn = 'A'
cap = cv2.VideoCapture(0)
while cap.isOpened():
    ret, frame = cap.read()
    if pointsRcnn > pointsYolo:
        cv2.putText(frame, 'mejor', (10, 450), font, 3, (0, 255, 0), 2,
cv2.LINE_AA)

    orig_image = frame
    frame_height, frame_width, _ = orig_image.shape
    image_resized = cv2.resize(orig_image, (500, 500))

    image = cv2.cvtColor(image_resized, cv2.COLOR_BGR2RGB)
    image = infer_transforms(image)
    image = torch.unsqueeze(image, 0)

    outputs = model(image)

    outputs = [{k: v.to('cpu') for k, v in t.items()} for t in
outputs]
    COLORS = np.random.uniform(0, 255, size=(len(CLASSES), 3))
    if len(outputs[0]['boxes']) != 0:
        draw_boxes, pred_classes, scores = convert_detections(
            outputs, 0.4, CLASSES, {'classes': None, 'track': False,
'no_labels': False})
        orig_image = inference_annotations(
            draw_boxes,
            pred_classes,
            scores,
            CLASSES,
            COLORS,
            orig_image,
            image_resized,

```

```

        {'classes': None, 'track': False, 'no_labels': False}
    )

#-----
#-----
#-----
YOLO-----

    ret, frame = cap.read()
    if pointsYolo > pointsRcnn:
        cv2.putText(frame, 'mejor', (10, 450), font, 3, (0, 255, 0), 2,
cv2.LINE_AA)

    results = yoloModel(frame)

#
#-----
#-----
#-----SHOW AND DECIDE WHO
WINS-----

data_frame = results.pandas().xyxy[0]
if not data_frame.empty:
    xmin_values = data_frame['name']
    yoloPred = xmin_values[0]
    if prevYolo == yoloPred:
        countYolo = countYolo + 1
        prevYolo = yoloPred
        if countYolo == 10:
            pointsYolo = pointsYolo + 1
            countYolo = 0
    else:
        countYolo = 0
        prevYolo = yoloPred

rcnnPredicted = pred_classes[0]
if prevRcnn == rcnnPredicted:
    countRcnn = countRcnn + 1
    prevRcnn = rcnnPredicted
    if countRcnn == 10:
        pointsRcnn = pointsRcnn + 1
        countRcnn = 0
else:
    countRcnn = 0
    prevRcnn = rcnnPredicted

if rcnnPredicted == yoloPred:

```

```

        if data_frame['confidence'][0] > scores[0]:
            pointsYolo = pointsYolo + 2
        elif scores[0] > data_frame['confidence'][0]:
            pointsRcnn = pointsRcnn + 2

    if len(scores):
        pointsRcnn = pointsRcnn - 1

    if len(data_frame['confidence']):
        pointsYolo = pointsYolo - 1

    cv2.imshow('rcnn', np.squeeze(orig_image))
    cv2.imshow('YOLO', np.squeeze(results.render()))
#-----
-----
    print("YOLO", pointsYolo)
    print("rcnn", pointsRcnn)
    if cv2.waitKey(1) & 0xFF == ord('q'):
        break
cap.release()
cv2.destroyAllWindows()

```

```

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rcnn -3
YOLO -4
rcnn -4
YOLO -5
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YOLO -7
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YOLO -13

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rcnn -13
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rcnn -69
YOLO -62
rcnn -70
```

```
print(len(scores))
```

```
print(len(data_frame['confidence']))
```

```
8
```

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```