

menggunakan data dari ultralytics

```
#install library ultralytics
!pip install ultralytics
```

Collecting ultralytics

Downloading ultralytics-8.0.206-py3-none-any.whl (644 kB)

644.9/644.9 kB 8.2 MB/s eta 0:00:00

Requirement already satisfied: matplotlib>=3.3.0 in /usr/local/lib/python3.10/dist-packages (from ultralytics) (3.3.0)
 Requirement already satisfied: numpy>=1.22.2 in /usr/local/lib/python3.10/dist-packages (from ultralytics) (1.23.0)
 Requirement already satisfied: opencv-python>=4.6.0 in /usr/local/lib/python3.10/dist-packages (from ultralytics) (4.6.0)
 Requirement already satisfied: pillow>=7.1.2 in /usr/local/lib/python3.10/dist-packages (from ultralytics) (9.4.0)
 Requirement already satisfied: pyyaml>=5.3.1 in /usr/local/lib/python3.10/dist-packages (from ultralytics) (6.0.1)
 Requirement already satisfied: requests>=2.23.0 in /usr/local/lib/python3.10/dist-packages (from ultralytics) (2.28.1)
 Requirement already satisfied: scipy>=1.4.1 in /usr/local/lib/python3.10/dist-packages (from ultralytics) (1.11.3)
 Requirement already satisfied: torch>=1.8.0 in /usr/local/lib/python3.10/dist-packages (from ultralytics) (2.0.1)
 Requirement already satisfied: torchvision>=0.9.0 in /usr/local/lib/python3.10/dist-packages (from ultralytics) (0.15.2)
 Requirement already satisfied: tqdm>=4.64.0 in /usr/local/lib/python3.10/dist-packages (from ultralytics) (4.66.1)
 Requirement already satisfied: pandas>=1.1.4 in /usr/local/lib/python3.10/dist-packages (from ultralytics) (1.5.3)
 Requirement already satisfied: seaborn>=0.11.0 in /usr/local/lib/python3.10/dist-packages (from ultralytics) (0.11.2)
 Requirement already satisfied: psutil in /usr/local/lib/python3.10/dist-packages (from ultralytics) (5.9.5)
 Requirement already satisfied: py-cpuinfo in /usr/local/lib/python3.10/dist-packages (from ultralytics) (9.0.0)
 Collecting thop>=0.1.1 (from ultralytics)

Downloading thop-0.1.1.post2209072238-py3-none-any.whl (15 kB)

Requirement already satisfied: contourpy>=1.0.1 in /usr/local/lib/python3.10/dist-packages (from matplotlib>=3.3.0->ultralytics) (1.0.7)
 Requirement already satisfied: cycler>=0.10 in /usr/local/lib/python3.10/dist-packages (from matplotlib>=3.3.0->ultralytics) (0.11.0)
 Requirement already satisfied: fonttools>=4.22.0 in /usr/local/lib/python3.10/dist-packages (from matplotlib>=3.3.0->ultralytics) (4.22.0)
 Requirement already satisfied: kiwisolver>=1.0.1 in /usr/local/lib/python3.10/dist-packages (from matplotlib>=3.3.0->ultralytics) (1.4.5)
 Requirement already satisfied: packaging>=20.0 in /usr/local/lib/python3.10/dist-packages (from matplotlib>=3.3.0->ultralytics) (23.1)
 Requirement already satisfied: pyparsing>=2.3.1 in /usr/local/lib/python3.10/dist-packages (from matplotlib>=3.3.0->ultralytics) (3.1.0)
 Requirement already satisfied: python-dateutil>=2.7 in /usr/local/lib/python3.10/dist-packages (from matplotlib>=3.3.0->ultralytics) (2.8.2)
 Requirement already satisfied: pytz>=2020.1 in /usr/local/lib/python3.10/dist-packages (from matplotlib>=3.3.0->ultralytics) (2022.7.1)
 Requirement already satisfied: charset-normalizer<4,>=2 in /usr/local/lib/python3.10/dist-packages (from requests>=2.23.0->ultralytics) (3.1.0)
 Requirement already satisfied: idna<4,>=2.5 in /usr/local/lib/python3.10/dist-packages (from requests>=2.23.0->ultralytics) (3.4)
 Requirement already satisfied: urllib3<3,>=1.21.1 in /usr/local/lib/python3.10/dist-packages (from requests>=2.23.0->ultralytics) (2.0.4)
 Requirement already satisfied: certifi>=2017.4.17 in /usr/local/lib/python3.10/dist-packages (from requests>=2.23.0->ultralytics) (2022.9.24)
 Requirement already satisfied: filelock in /usr/local/lib/python3.10/dist-packages (from torch>=1.8.0->ultralytics) (3.12.2)
 Requirement already satisfied: typing-extensions in /usr/local/lib/python3.10/dist-packages (from torch>=1.8.0->ultralytics) (4.5.0)
 Requirement already satisfied: sympy in /usr/local/lib/python3.10/dist-packages (from torch>=1.8.0->ultralytics) (1.11.1)
 Requirement already satisfied: networkx in /usr/local/lib/python3.10/dist-packages (from torch>=1.8.0->ultralytics) (2.8.8)
 Requirement already satisfied: Jinja2 in /usr/local/lib/python3.10/dist-packages (from torch>=1.8.0->ultralytics) (3.1.2)
 Requirement already satisfied: fsspec in /usr/local/lib/python3.10/dist-packages (from torch>=1.8.0->ultralytics) (2023.6.0)
 Requirement already satisfied: triton>=2.1.0 in /usr/local/lib/python3.10/dist-packages (from torch>=1.8.0->ultralytics) (2.1.0)
 Requirement already satisfied: six>=1.5 in /usr/local/lib/python3.10/dist-packages (from python-dateutil>=2.7->ultralytics) (1.16.0)
 Requirement already satisfied: MarkupSafe>=2.0 in /usr/local/lib/python3.10/dist-packages (from Jinja2->torch>=1.8.0->ultralytics) (2.1.2)
 Requirement already satisfied: mpmath>=0.19 in /usr/local/lib/python3.10/dist-packages (from sympy->torch>=1.8.0->ultralytics) (1.3.0)
 Installing collected packages: thop, ultralytics
 Successfully installed thop-0.1.1.post2209072238 ultralytics-8.0.206

```
from ultralytics import YOLO
# Membuat model YOLO baru
model = YOLO('yolov8n.yaml')
```

	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   897664 ultralytics.nn.modules.head.Detect [80, [64, 128, 256]]
YOLOv8n summary: 225 layers, 3157200 parameters, 3157184 gradients, 8.9 GFLOPs

```

```

# Load model YOLO yang sebelumnya sudah dilatih oleh ultralytics yang sudah berbobot
model = YOLO('yolov8n.pt')

```

```

Downloading https://github.com/ultralytics/assets/releases/download/v0.0.0/yolov8n.pt to 'yolov8n.pt'...
100%|██████████| 6.23M/6.23M [00:00<00:00, 103MB/s]

```

```

# Train model dengan data coco128.yml yang disediakan oleh ultralytics
results = model.train(data='coco128.yml', epochs=3)

```

elephant	128	17	0.903	0.824	0.87	0.67
bear	128	1	0.65	1	0.995	0.895
zebra	128	4	0.861	1	0.995	0.965
giraffe	128	9	0.694	0.889	0.931	0.71
backpack	128	6	0.708	0.415	0.43	0.291
umbrella	128	18	0.76	0.527	0.65	0.438
handbag	128	19	0.476	0.0501	0.161	0.0869
tie	128	7	0.7	0.714	0.685	0.48
suitcase	128	4	0.578	1	0.845	0.551
frisbee	128	5	0.657	0.77	0.732	0.639
skis	128	1	0.417	1	0.995	0.409
snowboard	128	7	0.819	0.714	0.738	0.481
sports ball	128	6	0.724	0.448	0.53	0.291
kite	128	10	0.687	0.4	0.534	0.169
baseball bat	128	4	0.489	0.5	0.476	0.197
baseball glove	128	7	0.663	0.429	0.429	0.294
skateboard	128	5	0.776	0.6	0.599	0.426
tennis racket	128	7	0.547	0.286	0.434	0.297
bottle	128	18	0.487	0.333	0.352	0.217
wine glass	128	16	0.75	0.375	0.551	0.314
cup	128	36	0.653	0.278	0.41	0.287
fork	128	6	1	0.293	0.372	0.256
knife	128	16	0.649	0.579	0.607	0.357
spoon	128	22	0.596	0.182	0.34	0.183
bowl	128	28	0.685	0.621	0.597	0.495
banana	128	1	0	0	0.166	0.0425
sandwich	128	2	0.348	0.545	0.745	0.745
orange	128	4	1	0.442	0.995	0.669
broccoli	128	11	0.659	0.182	0.259	0.229
carrot	128	24	0.688	0.367	0.644	0.403
hot dog	128	2	0.567	1	0.828	0.796
pizza	128	5	0.674	1	0.995	0.882
donut	128	14	0.623	1	0.922	0.842
cake	128	4	0.819	1	0.995	0.834
chair	128	35	0.469	0.543	0.454	0.268
couch	128	6	0.537	0.333	0.666	0.53
potted plant	128	14	0.557	0.571	0.667	0.462
bed	128	3	0.848	0.667	0.913	0.721
dining table	128	13	0.518	0.579	0.513	0.41
toilet	128	2	1	0.855	0.995	0.946
tv	128	2	0.549	0.5	0.638	0.61
laptop	128	3	1	0	0.533	0.426
mouse	128	2	1	0	0	0
remote	128	8	0.849	0.5	0.576	0.497
cell phone	128	8	0	0	0.0427	0.0205
microwave	128	3	0.418	1	0.83	0.699
oven	128	5	0.351	0.4	0.357	0.281
sink	128	6	0.351	0.167	0.242	0.166
refrigerator	128	5	0.506	0.4	0.659	0.521
book	128	29	0.531	0.103	0.281	0.15
clock	128	9	0.819	0.778	0.898	0.751
vase	128	2	0.44	1	0.828	0.745
scissors	128	1	1	0	0.199	0.0442
teddy bear	128	21	1	0.369	0.63	0.421
toothbrush	128	5	1	0.484	0.828	0.528

```

Speed: 0.6ms preprocess, 3.2ms inference, 0.0ms loss, 3.6ms postprocess per image
Results saved to runs/detect/train

```

```
# Evaluasi model dengan dataset validasi
results = model.val()
```

elephant	128	17	0.904	0.824	0.87	0.671
bear	128	1	0.651	1	0.995	0.895
zebra	128	4	0.86	1	0.995	0.953
giraffe	128	9	0.805	0.921	0.955	0.749
backpack	128	6	0.577	0.333	0.375	0.256
umbrella	128	18	0.758	0.524	0.653	0.439
handbag	128	19	0.46	0.0484	0.16	0.0871
tie	128	7	0.705	0.714	0.684	0.48
suitcase	128	4	0.582	1	0.845	0.551
frisbee	128	5	0.656	0.769	0.732	0.639
skis	128	1	0.424	1	0.995	0.41
snowboard	128	7	0.823	0.714	0.739	0.48
sports ball	128	6	0.723	0.446	0.514	0.283
kite	128	10	0.817	0.451	0.559	0.172
baseball bat	128	4	0.391	0.25	0.347	0.179
baseball glove	128	7	0.645	0.429	0.429	0.33
skateboard	128	5	0.853	0.6	0.599	0.44
tennis racket	128	7	0.716	0.371	0.46	0.331
bottle	128	18	0.444	0.333	0.354	0.21
wine glass	128	16	0.749	0.375	0.526	0.319
cup	128	36	0.63	0.285	0.406	0.291
fork	128	6	0.604	0.167	0.273	0.216
knife	128	16	0.622	0.562	0.614	0.368
spoon	128	22	0.693	0.182	0.349	0.195
bowl	128	28	0.748	0.635	0.63	0.519
banana	128	1	0	0	0.142	0.0435
sandwich	128	2	0.405	0.715	0.497	0.497
orange	128	4	1	0.441	0.995	0.669
broccoli	128	11	0.673	0.182	0.277	0.221
carrot	128	24	0.65	0.375	0.647	0.404
hot dog	128	2	0.555	1	0.828	0.828
pizza	128	5	0.696	1	0.995	0.866
donut	128	14	0.623	1	0.922	0.838
cake	128	4	0.68	1	0.995	0.834
chair	128	35	0.448	0.514	0.421	0.255
couch	128	6	0.643	0.5	0.739	0.584
potted plant	128	14	0.571	0.57	0.666	0.462
bed	128	3	1	0.922	0.995	0.777
dining table	128	13	0.464	0.462	0.487	0.388
toilet	128	2	1	0.853	0.995	0.946
tv	128	2	0.549	0.5	0.638	0.61
laptop	128	3	1	0	0.469	0.377
mouse	128	2	1	0	0.0388	0.00388
remote	128	8	0.851	0.5	0.605	0.511
cell phone	128	8	0	0	0.0422	0.0205
microwave	128	3	0.325	0.667	0.789	0.691
oven	128	5	0.348	0.4	0.359	0.282
sink	128	6	0.381	0.167	0.24	0.164
refrigerator	128	5	0.526	0.4	0.652	0.476
book	128	29	0.453	0.103	0.282	0.151
clock	128	9	0.818	0.778	0.903	0.735
vase	128	2	0.453	1	0.828	0.745
scissors	128	1	1	0	0.249	0.0546
teddy bear	128	21	1	0.368	0.627	0.419
toothbrush	128	5	0.683	0.439	0.815	0.53

Speed: 0.2ms preprocess, 24.5ms inference, 0.0ms loss, 8.1ms postprocess per image
Results saved to **runs/detect/train2**

```
# Melakukan deteksi objek dengan model yang sudah dibuat
results = model('https://ultralytics.com/images/bus.jpg')
```

Downloading <https://ultralytics.com/images/bus.jpg> to 'bus.jpg'...
100%|██████████| 476k/476k [00:00<00:00, 15.1MB/s]
image 1/1 /content/bus.jpg: 640x480 4 persons, 1 bus, 1 stop sign, 18.2ms
Speed: 3.8ms preprocess, 18.2ms inference, 3.0ms postprocess per image at shape (1, 3, 640, 480)

```
# inferensi model
model.predict('bus.jpg', save=True, imgsz=640)
```

```

refrigerator , /3: book , /4: clock , /5: vase , /6: scissors , /7: teddy bear , /8: hair drier , /9:
'toothbrush')
orig_img: array([[122, 148, 172],
                 [120, 146, 170],
                 [125, 153, 177],
                 ...,
                 [157, 170, 184],
                 [158, 171, 185],
                 [158, 171, 185]],

                [[127, 153, 177],
                 [124, 150, 174],
                 [127, 155, 179],
                 ...,
                 [158, 171, 185],
                 [159, 172, 186],
                 [159, 172, 186]],

                [[128, 154, 178],
                 [126, 152, 176],
                 [126, 154, 178],
                 ...,
                 [158, 171, 185],
                 [158, 171, 185],
                 [158, 171, 185]],

                ...,

                [[185, 185, 191],
                 [182, 182, 188],
                 [179, 179, 185],
                 ...,
                 [114, 107, 112],
                 [115, 105, 111],
                 [116, 106, 112]],

                [[157, 157, 163],
                 [180, 180, 186],
                 [185, 186, 190],
                 ...,
                 [107, 97, 103],
                 [102, 92, 98],
                 [108, 98, 104]],

                [[112, 112, 118],
                 [160, 160, 166],
                 [169, 170, 174],
                 ...,
                 [99, 89, 95],
                 [96, 86, 92],
                 [102, 92, 98]]], dtype=uint8)
orig_shape: (1080, 810)
path: '/content/bus.jpg'
probs: None
save_dir: 'runs/detect/train3'
speed: {'preprocess': 6.608131551370707, 'inference': 12.800455093383709, 'postprocess': 1.0800667090438476611

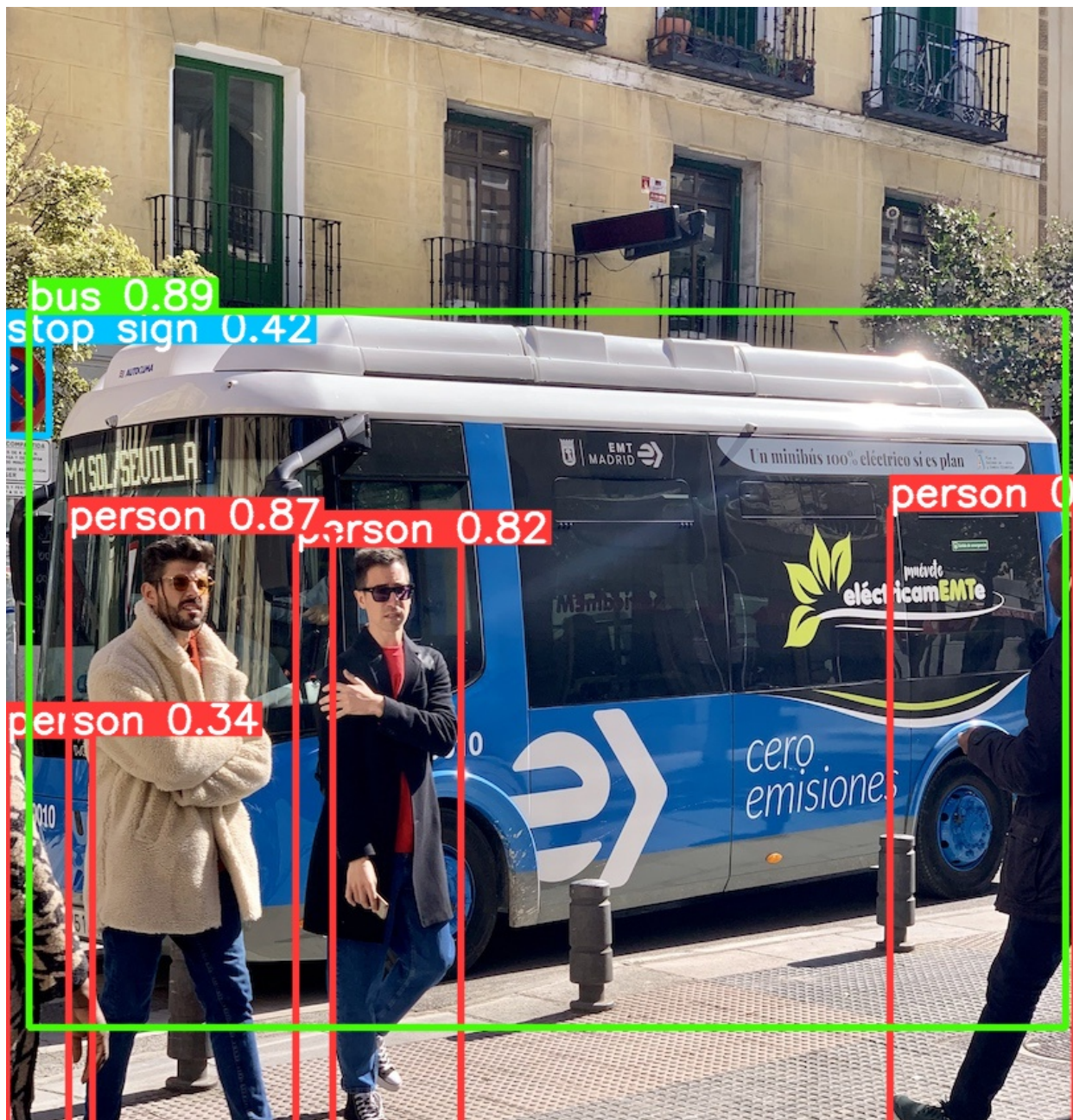
```

```

import os
from IPython.display import display, Image
from IPython import display
display.clear_output()

```

```
Image(filename=f'/content/runs/detect/train3/bus.jpg',width=600)
```

```
# Export the model to ONNX format
success = model.export(format='onnx')
```

Ultralytics YOLOv8.0.206 🚀 Python-3.10.12 torch-2.1.0+cu118 CPU (Intel Xeon 2.20GHz)

PyTorch: starting from 'runs/detect/train/weights/best.pt' with input shape (1, 3, 640, 640) BCHW and output shape (1, 3, 640, 640) BGR
requirements: Ultralytics requirement ['onnx>=1.12.0'] not found, attempting AutoUpdate...

Collecting onnx>=1.12.0

Downloading onnx-1.15.0-cp310-cp310-manylinux_2_17_x86_64.manylinux2014_x86_64.whl (15.7 MB)
 15.7/15.7 MB 64.8 MB/s eta 0:00:00

Requirement already satisfied: numpy in /usr/local/lib/python3.10/dist-packages (from onnx>=1.12.0) (1.23.5)

Requirement already satisfied: protobuf>=3.20.2 in /usr/local/lib/python3.10/dist-packages (from onnx>=1.12.0) (3.20.3)

Installing collected packages: onnx

Successfully installed onnx-1.15.0

requirements: AutoUpdate success ✅ 8.5s, installed 1 package: ['onnx>=1.12.0']

requirements: ⚠️ Restart runtime or rerun command for updates to take effect

ONNX: starting export with onnx 1.15.0 opset 17...

ONNX: export success ✅ 9.4s, saved as 'runs/detect/train/weights/best.onnx' (12.2 MB)

Export complete (11.1s)

Results saved to /content/runs/detect/train/weights

Predict: yolo predict task=detect model=runs/detect/train/weights/best.onnx imgsz=640

Validate: yolo val task=detect model=runs/detect/train/weights/best.onnx imgsz=640 data=/usr/local/lib/pyt

Visualize: <https://netron.app>

Menggunakan dataset sendiri

```
import locale
locale.getpreferredencoding = lambda: "UTF-8"
```

```
!pip install ultralytics
```

```
Requirement already satisfied: ultralytics in /usr/local/lib/python3.10/dist-packages (8.0.206)
Requirement already satisfied: matplotlib>=3.3.0 in /usr/local/lib/python3.10/dist-packages (from ultralytics) (3.3.0)
Requirement already satisfied: numpy>=1.22.2 in /usr/local/lib/python3.10/dist-packages (from ultralytics) (1.23.0)
Requirement already satisfied: opencv-python>=4.6.0 in /usr/local/lib/python3.10/dist-packages (from ultralytics) (4.6.0)
Requirement already satisfied: pillow>=7.1.2 in /usr/local/lib/python3.10/dist-packages (from ultralytics) (9.4.0)
Requirement already satisfied: pyyaml>=5.3.1 in /usr/local/lib/python3.10/dist-packages (from ultralytics) (6.0.1)
Requirement already satisfied: requests>=2.23.0 in /usr/local/lib/python3.10/dist-packages (from ultralytics) (2.28.1)
Requirement already satisfied: scipy>=1.4.1 in /usr/local/lib/python3.10/dist-packages (from ultralytics) (1.11.3)
Requirement already satisfied: torch>=1.8.0 in /usr/local/lib/python3.10/dist-packages (from ultralytics) (2.0.1)
Requirement already satisfied: torchvision>=0.9.0 in /usr/local/lib/python3.10/dist-packages (from ultralytics) (0.15.2)
Requirement already satisfied: tqdm>=4.64.0 in /usr/local/lib/python3.10/dist-packages (from ultralytics) (4.66.1)
Requirement already satisfied: pandas>=1.1.4 in /usr/local/lib/python3.10/dist-packages (from ultralytics) (1.5.3)
Requirement already satisfied: seaborn>=0.11.0 in /usr/local/lib/python3.10/dist-packages (from ultralytics) (0.11.2)
Requirement already satisfied: psutil in /usr/local/lib/python3.10/dist-packages (from ultralytics) (5.9.5)
Requirement already satisfied: py-cpuinfo in /usr/local/lib/python3.10/dist-packages (from ultralytics) (9.0.0)
Requirement already satisfied: thop>=0.1.1 in /usr/local/lib/python3.10/dist-packages (from ultralytics) (0.1.1)
Requirement already satisfied: contourpy>=1.0.1 in /usr/local/lib/python3.10/dist-packages (from matplotlib>=3.3.0->ultralytics) (1.0.7)
Requirement already satisfied: cycler>=0.10 in /usr/local/lib/python3.10/dist-packages (from matplotlib>=3.3.0->ultralytics) (0.11.0)
Requirement already satisfied: fonttools>=4.22.0 in /usr/local/lib/python3.10/dist-packages (from matplotlib>=3.3.0->ultralytics) (4.22.0)
Requirement already satisfied: kiwisolver>=1.0.1 in /usr/local/lib/python3.10/dist-packages (from matplotlib>=3.3.0->ultralytics) (1.4.5)
Requirement already satisfied: packaging>=20.0 in /usr/local/lib/python3.10/dist-packages (from matplotlib>=3.3.0->ultralytics) (21.3)
Requirement already satisfied: pyparsing>=2.3.1 in /usr/local/lib/python3.10/dist-packages (from matplotlib>=3.3.0->ultralytics) (3.0.9)
Requirement already satisfied: python-dateutil>=2.7 in /usr/local/lib/python3.10/dist-packages (from matplotlib>=3.3.0->ultralytics) (2.8.2)
Requirement already satisfied: pytz>=2020.1 in /usr/local/lib/python3.10/dist-packages (from pandas>=1.1.4->ultralytics) (2022.7)
Requirement already satisfied: charset-normalizer<4,>=2 in /usr/local/lib/python3.10/dist-packages (from requests>=2.23.0->ultralytics) (3.1.0)
Requirement already satisfied: idna<4,>=2.5 in /usr/local/lib/python3.10/dist-packages (from requests>=2.23.0->ultralytics) (3.4)
Requirement already satisfied: urllib3<3,>=1.21.1 in /usr/local/lib/python3.10/dist-packages (from requests>=2.23.0->ultralytics) (2.0.4)
Requirement already satisfied: certifi>=2017.4.17 in /usr/local/lib/python3.10/dist-packages (from requests>=2.23.0->ultralytics) (2022.9.24)
Requirement already satisfied: filelock in /usr/local/lib/python3.10/dist-packages (from torch>=1.8.0->ultralytics) (3.10.0)
Requirement already satisfied: typing-extensions in /usr/local/lib/python3.10/dist-packages (from torch>=1.8.0->ultralytics) (4.3.0)
Requirement already satisfied: sympy in /usr/local/lib/python3.10/dist-packages (from torch>=1.8.0->ultralytics) (1.10.1)
Requirement already satisfied: networkx in /usr/local/lib/python3.10/dist-packages (from torch>=1.8.0->ultralytics) (2.7)
Requirement already satisfied: Jinja2 in /usr/local/lib/python3.10/dist-packages (from torch>=1.8.0->ultralytics) (3.1.2)
Requirement already satisfied: fsspec in /usr/local/lib/python3.10/dist-packages (from torch>=1.8.0->ultralytics) (2022.9.0)
Requirement already satisfied: triton==2.1.0 in /usr/local/lib/python3.10/dist-packages (from torch>=1.8.0->ultralytics) (2.1.0)
Requirement already satisfied: six in /usr/local/lib/python3.10/dist-packages (from cycler>=0.10->matplotlib>=3.3.0->ultralytics) (1.16.0)
Requirement already satisfied: MarkupSafe>=2.0 in /usr/local/lib/python3.10/dist-packages (from Jinja2->torch>=1.8.0->ultralytics) (2.1.1)
Requirement already satisfied: mpmath>=0.19 in /usr/local/lib/python3.10/dist-packages (from sympy->torch>=1.8.0->ultralytics) (1.3.0)
```

```
!pip install roboflow
```

```
Requirement already satisfied: roboflow in /usr/local/lib/python3.10/dist-packages (1.1.9)
Requirement already satisfied: certifi==2023.7.22 in /usr/local/lib/python3.10/dist-packages (from roboflow) (2023.7.22)
Requirement already satisfied: chardet==4.0.0 in /usr/local/lib/python3.10/dist-packages (from roboflow) (4.0.0)
Requirement already satisfied: cycler==0.10.0 in /usr/local/lib/python3.10/dist-packages (from roboflow) (0.10.0)
Requirement already satisfied: idna==2.10 in /usr/local/lib/python3.10/dist-packages (from roboflow) (2.10)
Requirement already satisfied: kiwisolver>=1.3.1 in /usr/local/lib/python3.10/dist-packages (from roboflow) (1.4.5)
Requirement already satisfied: matplotlib in /usr/local/lib/python3.10/dist-packages (from roboflow) (3.7.1)
Requirement already satisfied: numpy>=1.18.5 in /usr/local/lib/python3.10/dist-packages (from roboflow) (1.23.5)
Requirement already satisfied: opencv-python-headless==4.8.0.74 in /usr/local/lib/python3.10/dist-packages (from roboflow) (4.8.0.74)
Requirement already satisfied: Pillow>=7.1.2 in /usr/local/lib/python3.10/dist-packages (from roboflow) (9.4.0)
Requirement already satisfied: pyparsing==2.4.7 in /usr/local/lib/python3.10/dist-packages (from roboflow) (2.4.7)
Requirement already satisfied: python-dateutil in /usr/local/lib/python3.10/dist-packages (from roboflow) (2.8.2)
Requirement already satisfied: python-dotenv in /usr/local/lib/python3.10/dist-packages (from roboflow) (1.0.0)
Requirement already satisfied: requests in /usr/local/lib/python3.10/dist-packages (from roboflow) (2.31.0)
Requirement already satisfied: six in /usr/local/lib/python3.10/dist-packages (from roboflow) (1.16.0)
Requirement already satisfied: supervision in /usr/local/lib/python3.10/dist-packages (from roboflow) (0.16.0)
Requirement already satisfied: urllib3>=1.26.6 in /usr/local/lib/python3.10/dist-packages (from roboflow) (2.0.4)
Requirement already satisfied: tqdm>=4.41.0 in /usr/local/lib/python3.10/dist-packages (from roboflow) (4.66.1)
Requirement already satisfied: PyYAML>=5.3.1 in /usr/local/lib/python3.10/dist-packages (from roboflow) (6.0.1)
Requirement already satisfied: requests-toolbelt in /usr/local/lib/python3.10/dist-packages (from roboflow) (1.0.0)
Requirement already satisfied: python-magic in /usr/local/lib/python3.10/dist-packages (from roboflow) (0.4.27)
Requirement already satisfied: contourpy>=1.0.1 in /usr/local/lib/python3.10/dist-packages (from matplotlib->roboflow) (1.0.7)
Requirement already satisfied: fonttools>=4.22.0 in /usr/local/lib/python3.10/dist-packages (from matplotlib->roboflow) (4.22.0)
Requirement already satisfied: packaging>=20.0 in /usr/local/lib/python3.10/dist-packages (from matplotlib->roboflow) (21.3)
Requirement already satisfied: charset-normalizer<4,>=2 in /usr/local/lib/python3.10/dist-packages (from requests) (3.1.0)
Requirement already satisfied: scipy<2.0.0,>=1.9.0 in /usr/local/lib/python3.10/dist-packages (from supervision->roboflow) (1.10.1)
```

```

from roboflow import Roboflow
rf = Roboflow(api_key="nBWWcXSg2urfLx1WVJfL")
project = rf.workspace("hochschule-munchen").project("groceryclassification")
dataset = project.version(5).download("yolov8")

```

loading Roboflow workspace...

loading Roboflow project...

Dependency ultralytics==8.0.196 is required but found version=8.0.206, to fix: `pip install ultralytics==8.0.196`
 Downloading Dataset Version Zip in GroceryClassification-5 to yolov8:: 100%|██████████| 41600/41600 [00:00<00:00,

Extracting Dataset Version Zip to GroceryClassification-5 in yolov8:: 100%|██████████| 2228/2228 [00:00<00:00, 49

```

from ultralytics import YOLO
# Membuat model YOLO baru
model2 = YOLO('yolov8n.yaml')

```

	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	897664	ultralytics.nn.modules.head.Detect	[80, [64, 128, 256]]

YOLOv8n summary: 225 layers, 3157200 parameters, 3157184 gradients, 8.9 GFLOPs

```

# Train the model using the 'data.yaml' dataset for 10 epochs
results = model2.train(data='/content/GroceryClassification-5/data.yaml', epochs=10)

```

	Class	Images	Instances	Box(P	R	mAP50	mAP50-95): 100%		3/3
	all	88	182	0.776	0.26	0.317	0.136		
Epoch	GPU_mem	box_loss	cls_loss	df1_loss	Instances	Size			
8/10	2.3G	1.514	2.044	2.314	39	640: 100%		63/63	[00:19<00
	Class	Images	Instances	Box(P	R	mAP50	mAP50-95): 100%		3/3
	all	88	182	0.418	0.479	0.426	0.173		
Epoch	GPU_mem	box_loss	cls_loss	df1_loss	Instances	Size			
9/10	2.27G	1.497	2.007	2.278	46	640: 100%		63/63	[00:20<00
	Class	Images	Instances	Box(P	R	mAP50	mAP50-95): 100%		3/3
	all	88	182	0.411	0.491	0.501	0.214		
Epoch	GPU_mem	box_loss	cls_loss	df1_loss	Instances	Size			
10/10	2.28G	1.401	1.857	2.19	18	640: 100%		63/63	[00:19<00
	Class	Images	Instances	Box(P	R	mAP50	mAP50-95): 100%		3/3
	all	88	182	0.528	0.519	0.455	0.191		

10 epochs completed in 0.064 hours.

Optimizer stripped from runs/detect/train6/weights/last.pt, 6.2MB

Optimizer stripped from runs/detect/train6/weights/best.pt, 6.2MB

Validating runs/detect/train6/weights/best.pt...

Ultralytics YOLOv8.0.206 Python-3.10.12 torch-2.1.0+cu118 CUDA:0 (Tesla T4, 15102MiB)

YOLOv8n summary (fused): 168 layers, 3006623 parameters, 0 gradients, 8.1 GFLOPs

	Class	Images	Instances	Box(P	R	mAP50	mAP50-95): 100%		3/3
	all	88	182	0.408	0.491	0.5	0.215		
	0	88	60	0.845	0.85	0.92	0.477		
	oatMilk	88	6	0.323	0.167	0.488	0.16		
	pasta	88	40	0.205	0.225	0.132	0.0443		
	potato	88	76	0.258	0.724	0.46	0.177		

Speed: 0.3ms preprocess, 2.5ms inference, 0.0ms loss, 4.3ms postprocess per image

Results saved to runs/detect/train6

Evaluate the model's performance on the validation set

results = model2.val()

Ultralytics YOLOv8.0.206 Python-3.10.12 torch-2.1.0+cu118 CUDA:0 (Tesla T4, 15102MiB)

YOLOv8n summary (fused): 168 layers, 3006623 parameters, 0 gradients, 8.1 GFLOPs

val: Scanning /content/GroceryClassification-5/valid/labels.cache... 88 images, 1 backgrounds, 0 corrupt: 100%

WARNING Box and segment counts should be equal, but got len(segments) = 7, len(boxes) = 182. To resolve this c

	Class	Images	Instances	Box(P	R	mAP50	mAP50-95): 100%		6/6 [0
	all	88	182	0.414	0.491	0.501	0.214		
	0	88	60	0.848	0.85	0.92	0.477		
	oatMilk	88	6	0.324	0.167	0.488	0.16		
	pasta	88	40	0.212	0.225	0.132	0.0441		
	potato	88	76	0.271	0.724	0.464	0.176		

Speed: 0.9ms preprocess, 6.9ms inference, 0.0ms loss, 5.0ms postprocess per image

Results saved to runs/detect/train62

Run inference

model2.predict('/content/tomato18.jpg', save=True, imgsz=320, conf=0.5)

boxes: ultralytics.engine.results.Boxes object

keypoints: None

masks: None

names: {0: '0', 1: 'oatMilk', 2: 'pasta', 3: 'potato', 4: 'tomato'}

orig_img: array([[30, 74, 45],

[30, 74, 45],

[30, 74, 43],

...,

[3, 74, 48],

[1, 69, 44],

[0, 66, 41]],

[[31, 75, 46],

[31, 75, 46],

[31, 75, 46],

...,

[3, 74, 48],


```

...,
[ 2, 73, 47],
[ 0, 68, 43],
[ 0, 66, 41]],

...,

[[12, 72, 62],
 [11, 71, 61],
 [12, 69, 60],
 ...,
 [ 2, 12, 12],
 [ 2, 12, 12],
 [ 1, 11, 11]],

[[11, 71, 61],
 [11, 71, 61],
 [12, 69, 60],
 ...,
 [ 1, 13, 13],
 [ 3, 13, 13],
 [ 3, 13, 13]],

[[11, 71, 61],
 [10, 70, 60],
 [12, 69, 60],
 ...,
 [ 2, 14, 14],
 [ 3, 13, 13],
 [ 3, 13, 13]]], dtype=uint8)
orig_shape: (534, 800)
path: '/content/tomato18.jpg'
probs: None
save_dir: 'runs/detect/train65'
speed: {'preprocess': 6.340503692626953, 'inference': 28.33867073059082, 'postprocess': 2.141714096069336}]

```

```

import os
from IPython.display import display, Image
from IPython import display
display.clear_output()

```

```
Image(filename=f'/content/runs/detect/train63/tomato18.jpg',width=600)
```



