In [1]: !pip install supervision
!pip install ultralytics

```
Collecting supervision
 Downloading supervision-0.18.0-py3-none-any.whl.metadata (12 kB)
Requirement already satisfied: defusedxml<0.8.0,>=0.7.1 in /opt/conda/lib/python3.10/site-packages (from supervision) (0.7.1)
Requirement already satisfied: matplotlib>=3.6.0 in /opt/conda/lib/python3.10/site-packages (from supervision) (3.7.5)
Requirement already satisfied: numpy>=1.21.2 in /opt/conda/lib/python3.10/site-packages (from supervision) (1.26.4)
Requirement already satisfied: opency-python-headless>=4.5.5.64 in /opt/conda/lib/python3.10/site-packages (from supervision)
(4.9.0.80)
Requirement already satisfied: pyyaml>=5.3 in /opt/conda/lib/python3.10/site-packages (from supervision) (6.0.1)
Requirement already satisfied: scipy<2.0.0,>=1.10.0 in /opt/conda/lib/python3.10/site-packages (from supervision) (1.11.4)
Requirement already satisfied: contourpy>=1.0.1 in /opt/conda/lib/python3.10/site-packages (from matplotlib>=3.6.0->supervisio
n) (1.2.0)
Requirement already satisfied: cycler>=0.10 in /opt/conda/lib/python3.10/site-packages (from matplotlib>=3.6.0->supervision)
(0.12.1)
Requirement already satisfied: fonttools>=4.22.0 in /opt/conda/lib/python3.10/site-packages (from matplotlib>=3.6.0->supervisio
n) (4.47.0)
Requirement already satisfied: kiwisolver>=1.0.1 in /opt/conda/lib/python3.10/site-packages (from matplotlib>=3.6.0->supervisio
n) (1.4.5)
Requirement already satisfied: packaging>=20.0 in /opt/conda/lib/python3.10/site-packages (from matplotlib>=3.6.0->supervision)
(21.3)
Requirement already satisfied: pillow>=6.2.0 in /opt/conda/lib/python3.10/site-packages (from matplotlib>=3.6.0->supervision)
(9.5.0)
Requirement already satisfied: pyparsing>=2.3.1 in /opt/conda/lib/python3.10/site-packages (from matplotlib>=3.6.0->supervisio
n) (3.1.1)
Requirement already satisfied: python-dateutil>=2.7 in /opt/conda/lib/python3.10/site-packages (from matplotlib>=3.6.0->supervi
sion) (2.8.2)
Requirement already satisfied: six>=1.5 in /opt/conda/lib/python3.10/site-packages (from python-dateutil>=2.7->matplotlib>=3.6.
0->supervision) (1.16.0)
Downloading supervision-0.18.0-py3-none-any.whl (86 kB)
                                         -- 86.7/86.7 kB 2.7 MB/s eta 0:00:00
Installing collected packages: supervision
Successfully installed supervision-0.18.0
Collecting ultralytics
 Downloading ultralytics-8.1.27-py3-none-any.whl.metadata (40 kB)
                                            - 40.3/40.3 kB 1.6 MB/s eta 0:00:00
Requirement already satisfied: matplotlib>=3.3.0 in /opt/conda/lib/python3.10/site-packages (from ultralytics) (3.7.5)
Requirement already satisfied: opency-python>=4.6.0 in /opt/conda/lib/python3.10/site-packages (from ultralytics) (4.9.0.80)
Requirement already satisfied: pillow>=7.1.2 in /opt/conda/lib/python3.10/site-packages (from ultralytics) (9.5.0)
Requirement already satisfied: pyyaml>=5.3.1 in /opt/conda/lib/python3.10/site-packages (from ultralytics) (6.0.1)
Requirement already satisfied: requests>=2.23.0 in /opt/conda/lib/python3.10/site-packages (from ultralytics) (2.31.0)
Requirement already satisfied: scipy>=1.4.1 in /opt/conda/lib/python3.10/site-packages (from ultralytics) (1.11.4)
Requirement already satisfied: torch>=1.8.0 in /opt/conda/lib/python3.10/site-packages (from ultralytics) (2.1.2)
```

```
Requirement already satisfied: torchvision>=0.9.0 in /opt/conda/lib/python3.10/site-packages (from ultralytics) (0.16.2)
Requirement already satisfied: tqdm>=4.64.0 in /opt/conda/lib/python3.10/site-packages (from ultralytics) (4.66.1)
Requirement already satisfied: psutil in /opt/conda/lib/python3.10/site-packages (from ultralytics) (5.9.3)
Requirement already satisfied: py-cpuinfo in /opt/conda/lib/python3.10/site-packages (from ultralytics) (9.0.0)
Collecting thop>=0.1.1 (from ultralytics)
 Downloading thop-0.1.1.post2209072238-py3-none-any.whl.metadata (2.7 kB)
Requirement already satisfied: pandas>=1.1.4 in /opt/conda/lib/python3.10/site-packages (from ultralytics) (2.1.4)
Requirement already satisfied: seaborn>=0.11.0 in /opt/conda/lib/python3.10/site-packages (from ultralytics) (0.12.2)
Requirement already satisfied: contourpy>=1.0.1 in /opt/conda/lib/python3.10/site-packages (from matplotlib>=3.3.0->ultralytic
s) (1.2.0)
Requirement already satisfied: cycler>=0.10 in /opt/conda/lib/python3.10/site-packages (from matplotlib>=3.3.0->ultralytics)
(0.12.1)
Requirement already satisfied: fonttools>=4.22.0 in /opt/conda/lib/python3.10/site-packages (from matplotlib>=3.3.0->ultralytic
s) (4.47.0)
Requirement already satisfied: kiwisolver>=1.0.1 in /opt/conda/lib/python3.10/site-packages (from matplotlib>=3.3.0->ultralytic
s) (1.4.5)
Requirement already satisfied: numpy<2,>=1.20 in /opt/conda/lib/python3.10/site-packages (from matplotlib>=3.3.0->ultralytics)
(1.26.4)
Requirement already satisfied: packaging>=20.0 in /opt/conda/lib/python3.10/site-packages (from matplotlib>=3.3.0->ultralytics)
(21.3)
Requirement already satisfied: pyparsing>=2.3.1 in /opt/conda/lib/python3.10/site-packages (from matplotlib>=3.3.0->ultralytic
s) (3.1.1)
Requirement already satisfied: python-dateutil>=2.7 in /opt/conda/lib/python3.10/site-packages (from matplotlib>=3.3.0->ultraly
tics) (2.8.2)
Requirement already satisfied: pytz>=2020.1 in /opt/conda/lib/python3.10/site-packages (from pandas>=1.1.4->ultralytics) (2023.
3.post1)
Requirement already satisfied: tzdata>=2022.1 in /opt/conda/lib/python3.10/site-packages (from pandas>=1.1.4->ultralytics) (202
3.4)
Requirement already satisfied: charset-normalizer<4,>=2 in /opt/conda/lib/python3.10/site-packages (from requests>=2.23.0->ultr
alvtics) (3.3.2)
Requirement already satisfied: idna<4,>=2.5 in /opt/conda/lib/python3.10/site-packages (from requests>=2.23.0->ultralytics) (3.
Requirement already satisfied: urllib3<3,>=1.21.1 in /opt/conda/lib/python3.10/site-packages (from requests>=2.23.0->ultralytic
s) (1.26.18)
Requirement already satisfied: certifi>=2017.4.17 in /opt/conda/lib/python3.10/site-packages (from requests>=2.23.0->ultralytic
s) (2024.2.2)
Requirement already satisfied: filelock in /opt/conda/lib/python3.10/site-packages (from torch>=1.8.0->ultralytics) (3.13.1)
Requirement already satisfied: typing-extensions in /opt/conda/lib/python3.10/site-packages (from torch>=1.8.0->ultralytics)
(4.9.0)
Requirement already satisfied: sympy in /opt/conda/lib/python3.10/site-packages (from torch>=1.8.0->ultralytics) (1.12)
Requirement already satisfied: networkx in /opt/conda/lib/python3.10/site-packages (from torch>=1.8.0->ultralytics) (3.2.1)
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Requirement already satisfied: jinja2 in /opt/conda/lib/python3.10/site-packages (from torch>=1.8.0->ultralytics) (3.1.2)
       Requirement already satisfied: fsspec in /opt/conda/lib/python3.10/site-packages (from torch>=1.8.0->ultralytics) (2024.2.0)
       Requirement already satisfied: six>=1.5 in /opt/conda/lib/python3.10/site-packages (from python-dateutil>=2.7->matplotlib>=3.3.
       0->ultralytics) (1.16.0)
       Requirement already satisfied: MarkupSafe>=2.0 in /opt/conda/lib/python3.10/site-packages (from jinja2->torch>=1.8.0->ultralyti
       cs) (2.1.3)
       Requirement already satisfied: mpmath>=0.19 in /opt/conda/lib/python3.10/site-packages (from sympy->torch>=1.8.0->ultralytics)
       (1.3.0)
       Downloading ultralytics-8.1.27-py3-none-any.whl (721 kB)
                                                 - 721.2/721.2 kB 17.9 MB/s eta 0:00:0000:01
       Downloading thop-0.1.1.post2209072238-py3-none-any.whl (15 kB)
       Installing collected packages: thop, ultralytics
       Successfully installed thop-0.1.1.post2209072238 ultralytics-8.1.27
In [2]: from warnings import filterwarnings
        filterwarnings(action="ignore")
        import os
        import yaml
        import shutil
        import numpy as np
        import pandas as pd
        import supervision as sv
        from ultralytics import YOLO
        import seaborn as sns
        import matplotlib.pyplot as plt
        %matplotlib inline
In [4]: test labels = "/kaggle/input/dms-driver-monitoring-system/test/labels"
        train labels = "/kaggle/input/dms-driver-monitoring-system/train/labels"
        val labels = "/kaggle/input/dms-driver-monitoring-system/valid/labels"
In [6]: data = {"labels":[], "split type":[]}
        for links, split type in zip([train labels, test labels, val labels], ["train", "test", "val"]):
            for labels in os.listdir(links):
                path = os.path.join(links, labels)
```

```
data["labels"].append(path)
                   data["split type"].append(split type)
         df = pd.DataFrame(data)
          print(df.shape)
          df.head()
         (9884, 2)
 Out[9]:
                                                                                                                                labels split_type
           0
                                                                                         /kaggle/input/dms-driver-monitoring-system/tra...
                                                                                                                                            train
          1
                                                                                         /kaggle/input/dms-driver-monitoring-system/tra...
                                                                                                                                            train
           2
                                                                                         /kaggle/input/dms-driver-monitoring-system/tra...
                                                                                                                                            train
          3
                                                                                         /kaggle/input/dms-driver-monitoring-system/tra...
                                                                                                                                            train
           4
                                                                                         /kaggle/input/dms-driver-monitoring-system/tra...
                                                                                                                                            train
In [26]: df.describe().T
Out[26]:
                                                                                                         count unique
                                                                                                                                       top
                                                                                                                                           freq
                                                                                                                        /kaggle/input/dms-
                                                                                                                         driver-monitoring-
              labels
                                                                                                          9884
                                                                                                                  9884
                                                                                                                               system/val...
          split_type
                                                                                                          9884
                                                                                                                     3
                                                                                                                                      train 5957
In [28]:
         for index, labels in enumerate(df["labels"]):
               if len(np.loadtxt(labels)) != 0:
                   df.loc[index, "is_annotated"] = True
               else:
                   df.loc[index, "is annotated"] = False
In [30]: df["is annotated"].value counts()
```

```
Out[30]: is_annotated True 9884
```

Name: count, dtype: int64

Obserservation:

• The annotated label seems ok for each rows.

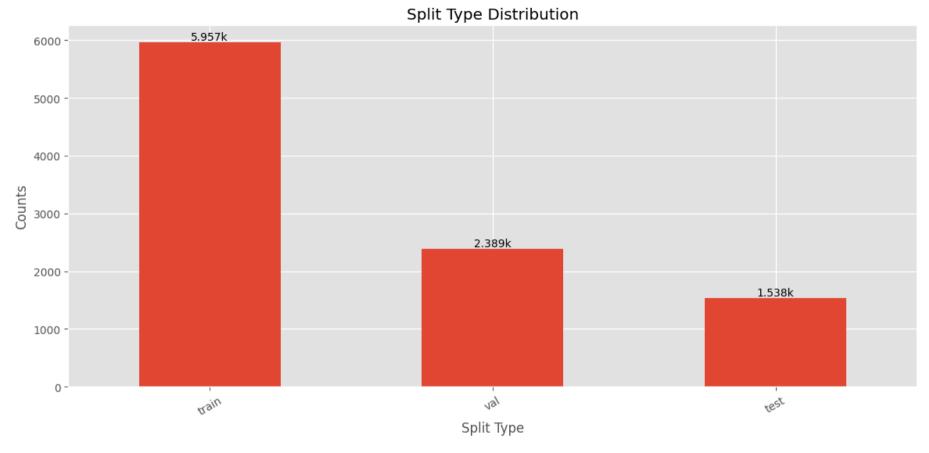
```
In [21]: plt.style.use("ggplot")

plt.figure(figsize=(14, 6))

barplot = df["split_type"].value_counts().plot(kind="bar")

for p in barplot.patches:
    h = p.get_height()
    barplot.text(p.get_x()+(p.get_width()/2), h, f"{h/1000:}k", va="bottom", ha="center")

barplot.set_title("Split Type Distribution")
barplot.set_xlabel("Split Type")
barplot.set_ylabel("Counts")
barplot.set_xitcklabels(labels=barplot.get_xticklabels(), rotation=30)
plt.show()
```



Ultralytics YOLOv8.1.27

✓ Python-3.10.13 torch-2.1.2 CUDA:0 (Tesla P100-PCIE-16GB, 16276MiB) engine/trainer: task=detect, mode=train, model=yolov8n.pt, data=/kaggle/input/dms-driver-monitoring-system/data.yaml, epochs=2 0, time=None, patience=100, batch=16, imgsz=640, save=True, save period=-1, cache=False, device=None, workers=8, project=None, name=train, exist ok=False, pretrained=True, optimizer=auto, verbose=True, seed=0, deterministic=True, single cls=False, rect=F alse, cos lr=False, close mosaic=10, resume=False, amp=True, fraction=1.0, profile=False, freeze=None, multi scale=False, overl ap mask=True, mask ratio=4, dropout=0.0, val=True, split=val, save json=False, save hybrid=False, conf=None, iou=0.7, max det=3 00, half=False, dnn=False, plots=True, source=None, vid stride=1, stream buffer=False, visualize=False, augment=False, agnostic nms=False, classes=None, retina masks=False, embed=None, show=False, save frames=False, save txt=False, save conf=False, save crop=False, show labels=True, show conf=True, show boxes=True, line width=None, format=torchscript, keras=False, optimize=False e, int8=False, dynamic=False, simplify=False, opset=None, workspace=4, nms=False, lr0=0.01, lrf=0.01, momentum=0.937, weight de cay=0.0005, warmup epochs=3.0, warmup momentum=0.8, warmup bias lr=0.1, box=7.5, cls=0.5, dfl=1.5, pose=12.0, kobj=1.0, label smoothing=0.0, nbs=64, hsv h=0.015, hsv s=0.7, hsv v=0.4, degrees=0.0, translate=0.1, scale=0.5, shear=0.0, perspective=0.0, fli pud=0.0, fliplr=0.5, mosaic=1.0, mixup=0.0, copy paste=0.0, auto augment=randaugment, erasing=0.4, crop fraction=1.0, cfg=None, tracker=botsort.yaml, save dir=runs/detect/train

Downloading https://ultralytics.com/assets/Arial.ttf to '/root/.config/Ultralytics/Arial.ttf'...

100% | 755k/755k [00:00<00:00, 18.9MB/s]

2024-03-12 09:29:15,599 INFO util.py:124 -- Outdated packages:

ipywidgets==7.7.1 found, needs ipywidgets>=8

Run `pip install -U ipywidgets`, then restart the notebook server for rich notebook output.

2024-03-12 09:29:16,454 INFO util.py:124 -- Outdated packages:

ipywidgets==7.7.1 found, needs ipywidgets>=8

Run `pip install -U ipywidgets`, then restart the notebook server for rich notebook output.

2024-03-12 09:29:18.923259: E external/local xla/xla/stream executor/cuda/cuda dnn.cc:9261] Unable to register cuDNN factory: A ttempting to register factory for plugin cuDNN when one has already been registered

2024-03-12 09:29:18.923359: E external/local xla/xla/stream executor/cuda/cuda fft.cc:607] Unable to register cuFFT factory: At tempting to register factory for plugin cuFFT when one has already been registered

2024-03-12 09:29:19.052716: E external/local xla/xla/stream executor/cuda/cuda blas.cc:1515] Unable to register cuBLAS factory: Attempting to register factory for plugin cuBLAS when one has already been registered

Overriding model.yaml nc=80 with nc=5

	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	752287	ultralytics.nn.modules.head.Detect	[5, [64, 128, 256]]
Model	summary: 225 layer	s,	3011823 pa	rameters, 3011807 gradients, 8.2 GFLOPs	

Transferred 319/355 items from pretrained weights

```
TensorBoard: Start with 'tensorboard --logdir runs/detect/train', view at http://localhost:6006/
```

```
wandb: Logging into wandb.ai. (Learn how to deploy a W&B server locally: https://wandb.me/wandb-server)
wandb: You can find your API key in your browser here: https://wandb.ai/authorize
wandb: Paste an API key from your profile and hit enter, or press ctrl+c to quit:
wandb: ERROR API key must be 40 characters long, yours was 41
wandb: Logging into wandb.ai. (Learn how to deploy a W&B server locally: https://wandb.me/wandb-server)
wandb: You can find your API key in your browser here: https://wandb.ai/authorize
wandb: Paste an API key from your profile and hit enter, or press ctrl+c to quit:
wandb: Appending key for api.wandb.ai to your netrc file: /root/.netrc
```

wandb version 0.16.4 is available! To upgrade, please run: \$ pip install wandb --upgrade

Tracking run with wandb version 0.16.3

Run data is saved locally in /kaggle/working/wandb/run-20240312 093058-16dlt3l1

Syncing run train to Weights & Biases (docs)

View project at https://wandb.ai/eddyblizzy14/YOLOv8

View run at https://wandb.ai/eddyblizzy14/YOLOv8/runs/16dlt3l1

Freezing layer 'model.22.dfl.conv.weight'

AMP: running Automatic Mixed Precision (AMP) checks with YOLOv8n...

AMP: checks passed <

train: Scanning /kaggle/input/dms-driver-monitoring-system/train/labels... 5957 images, 0 backgrounds, 0 corrupt: 100%| 5957/5957 [00:15<00:00, 387.28it/s]

train: WARNING ⚠ Cache directory /kaggle/input/dms-driver-monitoring-system/train is not writeable, cache not saved.

albumentations: Blur(p=0.01, blur_limit=(3, 7)), MedianBlur(p=0.01, blur_limit=(3, 7)), ToGray(p=0.01), CLAHE(p=0.01, clip_limit=(1, 4.0), tile grid size=(8, 8))

optimizer: 'optimizer=auto' found, ignoring 'lr0=0.01' and 'momentum=0.937' and determining best 'optimizer', 'lr0' and 'moment um' automatically...

optimizer: AdamW(lr=0.001111, momentum=0.9) with parameter groups 57 weight(decay=0.0), 64 weight(decay=0.0005), 63 bias(decay=
0.0)

TensorBoard: model graph visualization added ✓

Image sizes 640 train, 640 val

Using 4 dataloader workers

Logging results to runs/detect/train

Starting training for 20 epochs...

	Epoch	GPU_mem	box_loss	cls_loss	dfl_loss	Instances	S Size
	1/20	2.43G	1.462	2.133	1.249	27	640: 100% 373/373 [01:17<00:00, 4.81it/
S	7/20	2.46G	1.113	0.8174	1.073	18	640: 100% 373/373 [01:10<00:00, 5.29it/
s]5.71it/s]	27.00	_,,	0,027	_,,,,		, and a second property of the second propert
		Class	Images	Instances	Box(P	R	mAP50 mAP50-95): 100% 75/75 [00:13<00:00,
5	.74it/s]						
		all	2389	5773	0.848	0.763	8 0.834 0.535
	Epoch	GPU_mem	box_loss	cls_loss	dfl_loss	Instances	S Size

s]	8/20	2.45G	1.086	0.7903	1.059	14	640:	100%		373/373	[01:09<00:0	0,	5.33it/
5.81i	it/s]	Class	Images	Instances	Box(P	R	mAP50	mAP50-95):	100%		75/75 [0	0:12	<00:00,
	_	all	2389	5773	0.853	0.789	0.862	0.554					
	Epoch	GPU_mem	box_loss	cls_loss	dfl_loss	Instances	Size						
s]	9/20	2.46G	1.065	0.7646	1.053	23	640:	100%		373/373	[01:09<00:0	0,	5.37it/
5.94i	it/s]	Class	Images	Instances	Box(P	R	mAP50	mAP50-95):	100%		75/75 [0	0:12	<00:00,
	_	all	2389	5773	0.829	0.8	0.85	0.549					
	Epoch	GPU_mem	box_loss	cls_loss	dfl_loss	Instances	Size						
s]	10/20	2.46G	1.047	0.7466	1.047	25	640:	100%		373/373	[01:09<00:0	0,	5.36it/
5.81i	it/s]	Class	Images	Instances	Box(P	R	mAP50	mAP50-95):	100%		75/75 [0	0:12	<00:00,
	-	all	2389	5773	0.831	0.795	0.85	0.564					

Closing dataloader mosaic

albumentations: Blur(p=0.01, blur_limit=(3, 7)), MedianBlur(p=0.01, blur_limit=(3, 7)), ToGray(p=0.01), CLAHE(p=0.01, clip_limit=(1, 4.0), tile_grid_size=(8, 8))

	Epoch	GPU_mem	box_loss	cls_loss	dfl_loss	Instances	Size	
	11/20	2.46G	1.005	0.6669	1.05	9	640:	100% 373/373 [01:10<00:00, 5.30it/
s] 5.6	1it/s]	Class	Images	Instances	Box(P	R	mAP50	mAP50-95): 100% 75/75 [00:13<00:00,
	-	all	2389	5773	0.809	0.783	0.855	0.545
	Epoch	GPU_mem	box_loss	cls_loss	dfl_loss	Instances	Size	
	12/20	2.45G	0.98	0.6435	1.037	10	640:	100% 373/373 [01:08<00:00, 5.41it/
s]	6i+/cl	Class	Images	Instances	Box(P	R	mAP50	mAP50-95): 100% 75/75 [00:13<00:00,
5.0	011/2]	all	2389	5773	0 867	0 812	0 885	0 589
	F l.							0.505
5.6	6it/s] Epoch	all GPU_mem	2389 box_loss	5773 cls_loss	0.867 dfl_loss	0.812 Instances	0.885 Size	0.589

-1	13/20	2.46G	0.9611	0.6164	1.027	14	640:	100% 373/373 [01:09<00:00, 5.40it/
s]	it/s]	Class	Images	Instances	Box(P	R	mAP50	mAP50-95): 100% 75/75 [00:13<00:00,
3.70	10/3]	all	2389	5773	0.853	0.818	0.88	0.594
	Epoch	GPU_mem	box_loss	cls_loss	dfl_loss	Instances	Size	
s]	14/20	2.49G	0.948	0.6033	1.023	15	640:	100% 373/373 [01:08<00:00, 5.43it/
	it/s]	Class	Images	Instances	Box(P	R	mAP50	mAP50-95): 100% 75/75 [00:13<00:00,
		all	2389	5773	0.863	0.821	0.887	0.603
	Epoch	GPU_mem	box_loss	cls_loss	dfl_loss	Instances	Size	
s]	15/20	2.46G	0.9219	0.5766	1.011	11	640:	100% 373/373 [01:08<00:00, 5.42it/
E 7E	it/s]	Class	Images	Instances	Box(P	R	mAP50	mAP50-95): 100% 75/75 [00:13<00:00,
3.73	11/5]	all	2389	5773	0.873	0.825	0.894	0.618
	Epoch	GPU_mem	box_loss	cls_loss	dfl_loss	Instances	Size	
s]	16/20	2.45G	0.905	0.5607	1.001	15	640:	100% 373/373 [01:08<00:00, 5.45it/
		Class	Images	Instances	Box(P	R	mAP50	mAP50-95): 100% 75/75 [00:13<00:00,
5.76	it/s]	all	2389	5773	0.875	0.829	0.892	0.605
	Epoch	GPU mem	box loss			Instances	Size	0.003
7	17/20	2.46G	0.8925	0.5422	0.9958	12		100% 373/373 [01:08<00:00, 5.43it/
s]		Class	Images	Instances	Box(P	R	mAP50	mAP50-95): 100% 75/75 [00:13<00:00,
5.75	it/s]							
		all	2389	5773	0.883	0.847	0.906	0.627
	Epoch	GPU_mem	box_loss	_	_	Instances	Size	
s]	18/20	2.46G	0.8683	0.5231	0.9838	14	640:	100% 373/373 [01:08<00:00, 5.42it/
5 70	it/s]	Class	Images	Instances	Box(P	R	mAP50	mAP50-95): 100% 75/75 [00:13<00:00,
3.70	10/3]	all	2389	5773	0.878	0.849	0.907	0.631
	Epoch	GPU_mem	box_loss	cls_loss	dfl_loss	Instances	Size	

6]	19/20	2.46G	0.8515	0.5074	0.9757	13	640:	100%	373/373 [01:08<00:00, 5.42it/
s] 5.70	it/s]	Class	Images	Instances	Box(P	R	mAP50	mAP50-95): 100%	75/75 [00:13<00:00,
		all	2389	5773	0.898	0.842	0.913	0.646	
	Epoch	GPU_mem	box_loss	cls_loss	dfl_loss	Instances	Size		
6.1	20/20	2.45G	0.838	0.4929	0.9686	12	640:	100%	373/373 [01:09<00:00, 5.38it/
s] 5 71	it/s]	Class	Images	Instances	Box(P	R	mAP50	mAP50-95): 100%	75/75 [00:13<00:00,
3.71	10/3]	all	2389	5773	0.899	0.845	0.916	0.649	

20 epochs completed in 0.470 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 YOLOv8.1.27

✓ Python-3.10.13 torch-2.1.2 CUDA:0 (Tesla P100-PCIE-16GB, 16276MiB)

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

4.30it/s]	Class	Images	Instances	Box(P	R	mAP50	mAP50-95):	100%	75/75 [00:17<00:0	0,
	all	2389	5773	0.898	0.845	0.916	0.649			
	Open Eye	2389	2710	0.92	0.951	0.979	0.781			
	Closed Eye	2389	530	0.852	0.713	0.873	0.666			
	Cigarette	2389	453	0.849	0.722	0.817	0.448			
	Phone	2389	588	0.955	0.952	0.975	0.702			
	Seatbelt	2389	1492	0.916	0.887	0.934	0.647			

Speed: 0.1ms preprocess, 1.5ms inference, 0.0ms loss, 0.9ms postprocess per image

Results saved to runs/detect/train

VBox(children=(Label(value='12.247 MB of 12.247 MB uploaded\r'), FloatProgress(value=1.0, max=1.0)))

Run history:

val/dfl_loss

lr/pg0 lr/pg1 lr/pg2 metrics/mAP50(B) metrics/mAP50-95(B) metrics/precision(B) metrics/recall(B) model/GFLOPs model/parameters model/speed_PyTorch(ms) train/box_loss train/cls_loss train/dfl_loss val/box_loss val/cls_loss

Run summary:

lr/pg0	0.00012
lr/pg1	0.00012
lr/pg2	0.00012
metrics/mAP50(B)	0.91565
metrics/mAP50-95(B)	0.64872
metrics/precision(B)	0.8985
metrics/recall(B)	0.84511
model/GFLOPs	8.198
model/parameters	3011823
model/speed_PyTorch(ms)	1.645
train/box_loss	0.83799
train/cls_loss	0.49291
train/dfl_loss	0.96859
val/box_loss	0.94691
val/cls_loss	0.55473
val/dfl_loss	1.05781

View run **train** at: https://wandb.ai/eddyblizzy14/YOLOv8/runs/16dlt3l1 Synced 6 W&B file(s), 24 media file(s), 5 artifact file(s) and 0 other file(s) Find logs at: ./wandb/run-20240312_093058-16dlt3l1/logs

Out[3]: ultralytics.utils.metrics.DetMetrics object with attributes:

ap class index: array([0, 1, 2, 3, 4])box: ultralytics.utils.metrics.Metric object confusion matrix: <ultralytics.utils.metrics.ConfusionMatrix object at 0x78b4630fdc60> curves: ['Precision-Recall(B)', 'F1-Confidence(B)', 'Precision-Confidence(B)', 'Recall-Confidence(B)'] curves results: [[array([0, 0.001001, 0.003003, 0.002002, 0.004004, 0.005005, 0.006006, 0.0070 0.008008, 0.01001, 0.011011, 0.012012, 0.013013, 0.014014, 07, 0.009009, 0.015015, 0.016016, 0.017017, 0.018018, 0.019019, 0.02002, 0.021021, 0.022022. 0.023023. 0.024024. 0.025025, 0.026026, 0.027027, 0.028028, 0.029029, 0.03003. 0.031031. 0.032032. 0.033033, 0.034034, 0.035035, 0.036036, 0.037037, 0.038038, 0.039039, 0.04004, 0.041041, 0.04204 0.044044, 0.045045, 0.046046, 0.047047, 2, 0.043043, 0.05005, 0.048048. 0.049049, 0.051051, 0.052052. 0.053053, 0.054054. 0.055055. 0.056056, 0.057057, 0.058058, 0.059059, 0.06006, 0.061061, 0.062062, 0.063063, 0.064064, 0.065065, 0.06606 0.067067, 0.068068, 0.069069, 0.07007, 0.071071, 0.072072, 0.073073, 0.074074, 0.075075, 0.076076, 0.077077, 0.078078, 0.079079, 0.08008, 0.081081, 0.082082, 0.083083, 0.084084, 0.085085, 0.086086, 0.087087, 0.088088, 0.089089, 0.0900 0.092092, 0.093093, 0.094094, 0.095095, 0.091091, 0.096096, 0.097097, 0.098098, 0.099099, 0.1001, 0.1011, 0.1021, 0.1031, 0.1041, 0.10711, 0.11011, 0.10511, 0.10611, 0.10811, 0.10911, 0.11111, 0.11211, 0.11311, 0.11411, 0.11512, 0.11612, 0.11712, 0.11812, 0.11912, 0.12312, 0.12813, 0.12012, 0.12112, 0.12212, 0.12412, 0.12513, 0.12613, 0.12713, 0.12913, 0.13013, 0.13113, 0.13213, 0.13313, 0.13413, 0.13514, 0.13614. 0.13714. 0.13814, 0.13914, 0.14014, 0.14114, 0.14214, 0.14314, 0.14414, 0.14515, 0.14615, 0.14915, 0.15015, 0.14715, 0.14815, 0.15115, 0.15215, 0.15315, 0.15415, 0.15516, 0.15616, 0.15716, 0.15816, 0.15916, 0.16016, 0.16116, 0.16216, 0.16316, 0.16416, 0.16517, 0.16617, 0.16717, 0.16817, 0.17017, 0.17217, 0.17317, 0.16917, 0.17117, 0.17417, 0.17518, 0.17618, 0.17718, 0.17818, 0.17918, 0.18018, 0.18118, 0.18218, 0.18318, 0.18418, 0.18519, 0.18619, 0.18719, 0.18819, 0.18919, 0.19019, 0.19119, 0.19219, 0.19319, 0.19419, 0.1952, 0.1962, 0.1972, 0.1982, 0.1992, 0.2002, 0.2012, 0.2022, 0.2032, 0.20621, 0.20721, 0.20921, 0.21021, 0.2042, 0.20521, 0.20821, 0.21121, 0.21221, 0.21321, 0.21421, 0.21522, 0.21622, 0.21722, 0.21822, 0.21922, 0.22022, 0.22122, 0.22222, 0.22322, 0.22422, 0.22523, 0.22623, 0.22723, 0.22823, 0.22923, 0.23023, 0.23123, 0.23223, 0.23323, 0.23423, 0.23524, 0.23624, 0.23724, 0.23824, 0.23924, 0.24024, 0.24124, 0.24224, 0.24324, 0.24424, 0.24525, 0.24625, 0.24725, 0.24825, 0.25225, 0.25826, 0.24925, 0.25025, 0.25425, 0.25726, 0.25125, 0.25325, 0.25526, 0.25626, 0.25926, 0.26026, 0.26126, 0.26226, 0.26326, 0.26426, 0.26527, 0.26627, 0.26727, 0.26827, 0.26927, 0.27027, 0.27127, 0.27227,

0.27327,	0.27427, 0.28428,	0.27528, 0.28529,	0.27628,	0.27728,	0.27828,	0.27928,	0.28028,	0.28128,	0.28228,
0.28328,	0.28829,	0.28929,	0.28629, 0.29029,	0.28729, 0.29129,	a 20220	a 20220	0.29429,	0.2953,	0.2963,
0.2973,	•		0.3003,				0.3043,		0.30631,
0.30731,	0.30831,	0.30931,	0.31031,	0.31131,	0.3023,	0.3033,	0.3043,	0.50551,	0.50051,
0.50/51,	0.31231,	0.31331,	0.31431,		0 31632	0 31732	0.31832,	A 31032	0.32032,
0.32132,	0.32232,	•	0.32432,				0.32833,		•
0.33133,	0.33233,	0.33333,	0.33433,	0.33534,	0.52055,	0.52755,	0.52055,	0.52555,	0.55055,
0.55155,	0.33634,	0.33734,	0.33834,	•	0 3/03/	0 3/13/	0.34234,	0 3/33/	0.34434,
0.34535,	0.34635,	0.34735,	0.34835,				0.35235,		
0.35536,	0.35636,	0.35736,	0.35836,	0.35936,	0.55055,	0.55155,	0.33233,	0.33333,	0.55455,
0.55550,	0.36036,	0.36136,	0.36236,	0.36336,	0 36436	0 36537	0.36637,	0 36737	0.36837,
0.36937,	0.37037,		0.37237,				0.37638,		
0.37938,	0.38038,		0.38238,	0.38338,	0.57457,	0.57556,	0.57050,	0.57756,	0.57656,
0.57556,	0.38438,	0.38539,	0.38639,	0.38739,	0 38839	0 38939	0.39039,	0 30130	0.39239,
0.39339,	0.39439,	0.3954,	0.3964,				0.4004,		•
0.4034,		0.40541,	0.40641,	0.40741,	0.5504,	0.5554,	0.4004,	0.4014,	0.4024,
0.4054,	0.40841,	•	0.41041,	,	0 /12/1	0 /13/1	0.41441,	0 /15/2	0.41642,
0.41742,	0.41842,	0.41942,	0.42042,				0.42442,		•
0.42743,	0.42843,	0.42943,	0.43043,	0.43143,	0.42242,	0.42342,	0.42442,	0.42545,	0.42043,
0.42/43,	0.43243,	-	0.43443,	•	0 43644	0 43744	0.43844,	0 43944	0.44044,
0.44144,	0.44244,		0.44444,				0.44845,		•
0.45145,	0.45245,	0.45345,	0.45445,	0.45546,	0.44045,	0.44743,	0.44045,	0.44545,	0.43043,
0.43143,	0.45646,	0.45746,	0.45846,	,	0 46046	0 46146	0.46246,	0 46346	0.46446,
0.46547,	0.46647,	0.46747,	0.46847,				0.47247,		•
0.47548,	0.47648,	0.47748,	0.47848,	0.47948,	0.47047,	0.4/14/,	0.47247,	0.47547,	0.47447,
0.47540,	0.48048,	0.48148,	0.48248,	0.48348,	0 18118	0 48549	0.48649,	0 48749	0.48849,
0.48949,	0.49049,	0.49149,	0.49249,				0.4965,		•
0.4995,		0.5015,	0.5025,	0.5035,	0.45445,	0.4555,	0.4505,	0.4373,	0.4505,
0.4555,	0.5045,	•	0.50651,	0.50751,	0 50851	0 50951	0.51051,	0 51151	0.51251,
0.51351,	0.51451,	•	0.51652,				0.52052,		•
0.52352,	0.52452,	0.52553,	0.52653,	0.52753,	0.01001	0.51552,	0.32032,	0.32132,	0.32232,
0.32332,		0.52953,			0.53253.	0.53353.	0.53453,	0.53554.	0.53654,
0.53754,	0.53854,						0.54454,		0.54655,
0.54755,	0.54855,	0.54955,	0.55055,	0.55155,	0.00.00.,	.,	0.0	010.000,	015.055,
0.0.7.00,	0.55255,	0.55355,	0.55455,	0.55556,	0.55656,	0.55756,	0.55856,	0.55956,	0.56056,
0.56156,	0.56256,	0.56356,	0.56456,	0.56557,		•	0.56857,		
0.57157,	0.57257,		0.57457,	0.57558,	,	2.20.2.,	,	,	2.2.02.,
,	0.57658,		0.57858,	0.57958,	0.58058,	0.58158,	0.58258,	0.58358,	0.58458,
0.58559,	0.58659,	•	0.58859,	0.58959,	0.59059,			-	
0.5956,	0.5966,	0.5976,	0.5986,	0.5996,	,	,	- · - · · ·	,	,
	- · ,	- · - ,		- · - ,					

0.60961,	0.6006, 0.61061,	0.6016, 0.61161,	0.6026, 0.61261,	0.6036, 0.61361,	0.6046, 0.61461,	0.60561, 0.61562,		-	0.60861, 0.61862,
0.61962,	0.62062,	0.62162,	0.62262,	0.62362,					
	0.62462,	0.62563,	0.62663,	0.62763,	0.62863,	0.62963,	0.63063,	0.63163,	0.63263,
0.63363,	0.63463,	0.63564,	0.63664,	0.63764,	0.63864,	0.63964,	0.64064,	0.64164,	0.64264,
0.64364,	0.64464,	0.64565,	0.64665,	0.64765,					
	0.64865,	0.64965,	0.65065,	0.65165,	0.65265,	0.65365,	0.65465,	0.65566,	0.65666,
0.65766,	0.65866,	0.65966,	0.66066,	0.66166,	0.66266,	0.66366,	0.66466,	0.66567,	0.66667,
0.66767,	0.66867,	0.66967,	0.67067,	0.67167,					
	0.67267,	0.67367,	0.67467,	0.67568,	0.67668,	0.67768,	0.67868,	0.67968,	0.68068,
0.68168,	0.68268,	0.68368,	0.68468,	0.68569,	0.68669,	0.68769,	0.68869,	0.68969,	0.69069,
0.69169,	0.69269,	0.69369,	0.69469,	0.6957,					
	0.6967,	0.6977,	0.6987,	0.6997,	0.7007,	0.7017,	0.7027,	0.7037,	0.7047,
0.70571,	0.70671,	0.70771,	0.70871,	0.70971,	0.71071,	0.71171,	0.71271,	0.71371,	0.71471,
0.71572,	0.71672,	0.71772,	0.71872,	0.71972,					
	0.72072,	0.72172,	0.72272,	0.72372,	0.72472,	0.72573,	0.72673,	0.72773,	0.72873,
0.72973,	0.73073,	0.73173,	0.73273,	0.73373,	0.73473,	0.73574,	0.73674,	0.73774,	0.73874,
0.73974,	0.74074,	0.74174,	0.74274,	0.74374,					
	0.74474,	0.74575,	0.74675,	0.74775,	0.74875,	0.74975,	0.75075,	0.75175,	0.75275,
0.75375,	0.75475,	0.75576,	0.75676,	0.75776,	0.75876,	0.75976,	0.76076,	0.76176,	0.76276,
0.76376,	0.76476,	0.76577,	0.76677,	0.76777,					
	0.76877,	0.76977,	0.77077,	0.77177,	0.77277,	0.77377,	0.77477,	0.77578,	0.77678,
0.77778,	0.77878,	0.77978,	0.78078,	0.78178,	0.78278,	0.78378,	0.78478,	0.78579,	0.78679,
0.78779,	0.78879,	0.78979,	0.79079,	0.79179,					
	0.79279,	0.79379,	0.79479,	0.7958,	0.7968,	0.7978,	0.7988,	0.7998,	0.8008,
0.8018,	0.8028,	0.8038,	0.8048,	0.80581,	0.80681,	0.80781,	0.80881,	0.80981,	0.81081,
0.81181,	0.81281,	0.81381,	0.81481,	0.81582,					
	0.81682,	0.81782,	0.81882,	0.81982,	0.82082,	0.82182,	0.82282,	0.82382,	0.82482,
0.82583,	0.82683,	0.82783,	0.82883,	0.82983,	0.83083,	0.83183,	0.83283,	0.83383,	0.83483,
0.83584,	0.83684,	0.83784,	0.83884,	0.83984,					
	0.84084,	0.84184,	0.84284,	0.84384,	0.84484,	0.84585,	0.84685,	0.84785,	0.84885,
0.84985,	0.85085,	0.85185,	0.85285,	0.85385,	0.85485,	0.85586,	0.85686,	0.85786,	0.85886,
0.85986,	0.86086,	0.86186,	0.86286,	0.86386,					
	0.86486,	0.86587,	0.86687,	0.86787,	0.86887,	0.86987,	0.87087,	0.87187,	0.87287,
0.87387,	0.87487,	0.87588,	0.87688,	0.87788,	0.87888,	0.87988,	0.88088,	0.88188,	0.88288,
0.88388,	0.88488,	0.88589,	0.88689,	0.88789,					
	0.88889,	0.88989,	0.89089,	0.89189,	0.89289,	0.89389,	0.89489,	0.8959,	0.8969,
0.8979,	0.8989,	0.8999,	0.9009,	0.9019,	0.9029,	0.9039,	0.9049,	0.90591,	0.90691,
0.90791,	0.90891,	0.90991,	0.91091,	0.91191,					
	0.91291,	0.91391,	0.91491,	0.91592,	0.91692,	0.91792,	0.91892,	0.91992,	0.92092,
0.92192,	0.92292,	0.92392,	0.92492,	0.92593,	0.92693,	0.92793,	0.92893,	0.92993,	0.93093,

0.93193,	0.93293,	0.93393,	0.93493,	0.93594,					
						0.94194,	0.94294,	0.94394,	0.94494,
0.94595,						0.95195,			
0.95596,	0.95696,	0.95796,	0.95896,	0.95996,					
	0.96096,	0.96196,	0.96296,	0.96396,	0.96496,	0.96597,	0.96697,	0.96797,	0.96897,
0.96997,	0.97097,	0.97197,	0.97297,	0.97397,	0.97497,	0.97598,	0.97698,	0.97798,	0.97898,
0.97998,		0.98198,							
						0.98999,			
0.99399,	0.99499,	0.996,	0.997,	0.998,	0.999,	1])	, array([[1,	1,
1,,	0.15174,	0.075869,	0],						
[1,	1,	1, .	, 0.0156	45, 0.00782	27,	0],		
]	1,	1,	1, .	, 0.00323	81, 0.0016	19,	0],		
[59,			
[91,			
						5005, 0.00			
						0.015015,	0.016016,	0.017017,	0.018018,
0.019019,		0.021021,							
						0.029029,			
						0.039039,	0.04004,	0.041041,	0.04204
2, 0.04	-	44044, 0.0	-	-	•				
						0.053053,			
						0.063063,	0.064064,	0.065065,	0.06606
6, 0.00		68068, 0.0							
						0.077077,			
						0.087087,	0.088088,	0.089089,	0.0900
9, 0.09		92092, 0.0							
0 40544						0.1011,			
						0.11111,	0.11211,	0.11311,	0.11411,
0.11512,		0.11712,				0 12512	0 12612	0 12712	0 12012
0 12012						0.12513,			
0.12913,	0.13013,	0.13113,	0.13213,	0.13313,	0.13413,	0.13514,	0.13614,	0.13/14,	0.13814,
0.13914,	0.14014,	0.14114,	0.14214,	0.14314,	0 14015	0 14015	0 15015	0 15115	0 15315
0 15315						0.14915,			
0.15315,	0.15415,					0.15916,	0.10010,	0.10110,	0.10210,
0.16316,		0.16517,				0 17217	0 17/17	0 17510	0 17610
Q 17710	0.16817,	0.16917, 0.17918,	0.17017,	0.17117,		0.17317,		0.17518,	0.17618,
0.17718,	0.17818,		0.18018,	0.18118,	0.18218,	0.18318,	0.18418,	0.18519,	0.18619,
0.18719,	0.18819,	0.18919,	0.19019,	0.19119,	Q 1062	0 1072	a 1092	A 1002	0.2002,
0 2012	0.19219,	0.19319,	0.19419,	0.1952,	0.1962,	0.1972, 0.20721,	0.1982,	0.1992,	-
0.2012,	0.2022,	0.2032,	0.2042,	0.20521,	0.20621,	0.20/21,	0.20821,	0.20921,	0.21021,
0.21121,	0.21221,	0.21321,	0.21421,	0.21522,					

	0.22623,		0.21822, 0.22823, 0.23824,				0.22222, 0.23223,		0.22422, 0.23423,
	0.24024,	0.24124,	0.24224,	0.24324,	0.24424,	0.24525,	0.24625,	0.24725,	0.24825,
0.24925,	0.25025,	0.25125,	0.25225,	0.25325,	0.25425,	0.25526,	0.25626,	0.25726,	0.25826,
0.25926,	0.26026,	0.26126,	0.26226,	0.26326,					
	0.26426,	0.26527,	0.26627,	0.26727,	0.26827,	0.26927,	0.27027,	0.27127,	0.27227,
0.27327,	0.27427,	0.27528,	0.27628,	0.27728,	0.27828,	0.27928,	0.28028,	0.28128,	0.28228,
0.28328,	0.28428,	0.28529,	0.28629,	0.28729,					
	0.28829,	0.28929,	0.29029,	0.29129,	0.29229,	0.29329,	0.29429,	0.2953,	0.2963,
0.2973,	0.2983,	0.2993,	0.3003,	0.3013,	0.3023,	0.3033,	0.3043,	0.30531,	0.30631,
0.30731,	0.30831,	0.30931,	0.31031,	0.31131,					
	0.31231,	0.31331,	0.31431,	0.31532,	0.31632,	0.31732,	0.31832,	0.31932,	0.32032,
0.32132,	0.32232,	0.32332,	0.32432,	0.32533,	0.32633,	0.32733,	0.32833,	0.32933,	0.33033,
0.33133,	0.33233,	0.33333,	0.33433,	0.33534,					
	0.33634,	0.33734,	0.33834,	0.33934,	0.34034,	0.34134,	0.34234,	0.34334,	0.34434,
0.34535,	0.34635,	0.34735,	0.34835,	0.34935,	0.35035,	0.35135,	0.35235,	0.35335,	0.35435,
0.35536,	0.35636,	0.35736,	0.35836,	0.35936,					
	0.36036,	0.36136,	0.36236,	0.36336,	0.36436,	0.36537,	0.36637,	0.36737,	0.36837,
0.36937,	0.37037,	0.37137,	0.37237,	0.37337,	0.37437,	0.37538,	0.37638,	0.37738,	0.37838,
0.37938,	0.38038,	0.38138,	0.38238,	0.38338,					
	0.38438,	0.38539,	0.38639,	0.38739,	0.38839,	0.38939,	0.39039,	0.39139,	0.39239,
0.39339,	0.39439,	0.3954,	0.3964,	0.3974,	0.3984,	0.3994,	0.4004,	0.4014,	0.4024,
0.4034,	0.4044,	0.40541,	0.40641,	0.40741,					
	0.40841,	0.40941,	0.41041,				0.41441,		0.41642,
0.41742,	0.41842,	0.41942,	0.42042,	0.42142,	0.42242,	0.42342,	0.42442,	0.42543,	0.42643,
0.42743,	0.42843,	0.42943,	0.43043,	0.43143,					
	0.43243,	0.43343,	0.43443,	0.43544,	0.43644,	0.43744,	0.43844,	0.43944,	0.44044,
0.44144,	0.44244,	0.44344,	0.44444,	0.44545,	0.44645,	0.44745,	0.44845,	0.44945,	0.45045,
0.45145,	0.45245,	0.45345,	0.45445,	0.45546,					
	0.45646,	0.45746,	0.45846,	0.45946,	0.46046,	0.46146,	0.46246,	0.46346,	0.46446,
0.46547,	0.46647,	0.46747,	0.46847,	0.46947,	0.47047,	0.47147,	0.47247,	0.47347,	0.47447,
0.47548,	0.47648,	0.47748,	0.47848,	0.47948,					
	0.48048,	0.48148,	0.48248,	0.48348,	0.48448,		0.48649,	0.48749,	0.48849,
0.48949,	0.49049,	0.49149,	0.49249,	0.49349,	0.49449,	0.4955,	0.4965,	0.4975,	0.4985,
0.4995,	0.5005,	0.5015,	0.5025,	0.5035,					
	0.5045,	0.50551,	0.50651,	0.50751,	0.50851,	0.50951,	0.51051,	0.51151,	0.51251,
0.51351,	0.51451,	0.51552,	0.51652,	0.51752,	0.51852,	0.51952,	0.52052,	0.52152,	0.52252,
0.52352,	0.52452,	0.52553,	0.52653,	0.52753,					
	0.52853,	0.52953,	0.53053,	0.53153,	0.53253,	0.53353,	0.53453,	0.53554,	0.53654,
0.53754,	0.53854,	0.53954,	0.54054,	0.54154,	0.54254,	0.54354,	0.54454,	0.54555,	0.54655,

0.54755,	0.54855,	0.54955,	0.55055,	0.55155,					
	0.55255,	0.55355,	0.55455,	0.55556,	-		0.55856,		0.56056,
0.56156,	0.56256,	0.56356,	0.56456,	0.56557,	0.56657,	0.56757,	0.56857,	0.56957,	0.57057,
0.57157,	0.57257,	0.57357,	0.57457,	0.57558,					
	0.57658,	0.57758,	0.57858,	0.57958,	0.58058,		0.58258,		0.58458,
0.58559,	0.58659,	0.58759,	0.58859,	0.58959,	0.59059,	0.59159,	0.59259,	0.59359,	0.59459,
0.5956,	0.5966,	0.5976,	0.5986,	0.5996,					
	0.6006,	0.6016,	0.6026,	0.6036,	-		-	•	0.60861,
0.60961,	0.61061,	0.61161,	0.61261,	0.61361,	0.61461,	0.61562,	0.61662,	0.61762,	0.61862,
0.61962,	0.62062,	0.62162,	0.62262,	0.62362,					
	0.62462,	0.62563,	0.62663,	0.62763,	0.62863,	0.62963,	0.63063,	0.63163,	0.63263,
0.63363,	0.63463,	0.63564,	0.63664,	0.63764,	0.63864,	0.63964,	0.64064,	0.64164,	0.64264,
0.64364,	0.64464,	0.64565,	0.64665,	0.64765,					
	0.64865,	0.64965,	0.65065,	0.65165,	0.65265,	0.65365,	0.65465,	0.65566,	0.65666,
0.65766,	0.65866,	0.65966,	0.66066,	0.66166,	0.66266,	0.66366,	0.66466,	0.66567,	0.66667,
0.66767,	0.66867,	0.66967,	0.67067,	0.67167,					
	0.67267,	0.67367,	0.67467,	0.67568,	0.67668,	0.67768,	0.67868,	0.67968,	0.68068,
0.68168,	0.68268,	0.68368,	0.68468,	0.68569,	0.68669,	0.68769,	0.68869,	0.68969,	0.69069,
0.69169,	0.69269,	0.69369,	0.69469,	0.6957,					
	0.6967,	0.6977,	0.6987,	0.6997,	0.7007,	0.7017,	0.7027,	0.7037,	0.7047,
0.70571,	0.70671,	0.70771,	0.70871,	0.70971,	0.71071,	0.71171,	0.71271,	0.71371,	0.71471,
0.71572,	0.71672,	0.71772,	0.71872,	0.71972,					
	0.72072,	0.72172,	0.72272,	0.72372,	0.72472,	0.72573,	0.72673,	0.72773,	0.72873,
0.72973,	0.73073,	0.73173,	0.73273,	0.73373,	0.73473,	0.73574,	0.73674,	0.73774,	0.73874,
0.73974,	0.74074,	0.74174,	0.74274,	0.74374,					
	0.74474,	0.74575,	0.74675,	0.74775,	0.74875,	0.74975,	0.75075,	0.75175,	0.75275,
0.75375,	0.75475,	0.75576,	0.75676,	0.75776,	0.75876,	0.75976,	0.76076,	0.76176,	0.76276,
0.76376,	0.76476,	0.76577,	0.76677,	0.76777,					
	0.76877,	0.76977,	0.77077,	0.77177,	0.77277,	0.77377,	0.77477,	0.77578,	0.77678,
0.77778,	0.77878,	0.77978,	0.78078,	0.78178,			0.78478,		0.78679,
0.78779,	0.78879,	0.78979,	0.79079,	0.79179,					
	0.79279,	0.79379,	0.79479,	0.7958,	0.7968,	0.7978,	0.7988,	0.7998,	0.8008,
0.8018,	0.8028,	0.8038,	0.8048,	0.80581,	0.80681,	0.80781,	0.80881,	0.80981,	0.81081,
0.81181,	0.81281,	0.81381,	0.81481,	0.81582,	ĺ	•	ĺ	ĺ	•
•	0.81682,	0.81782,	0.81882,	0.81982,	0.82082,	0.82182,	0.82282,	0.82382,	0.82482,
0.82583,	0.82683,	0.82783,	0.82883,	0.82983,	0.83083,	•	•	•	0.83483,
0.83584,	0.83684,	0.83784,	0.83884,	0.83984,	,	,		,	,
-	0.84084,	0.84184,	0.84284,	0.84384,	0.84484,	0.84585,	0.84685,	0.84785,	0.84885,
0.84985,	0.85085,		0.85285,	0.85385,	0.85485,	0.85586,	0.85686,		0.85886,
0.85986,	0.86086,	0.86186,	0.86286,	0.86386,		2.32200,	2.32000,	2.32.00,	1.22000,
3.33300,	0.86486,	0.86587,	0.86687,	0.86787,	0.86887,	0.86987,	0.87087,	0.87187,	0.87287,
	,	,	,	,	3.00007,	3,0050,	3.07007,	0.07.207,	0.07.207,

						0.87988,	0.88088,	0.88188,	0.88288,
0.88388,	0.88488,					0.00200	0.00400	0.0050	0.0000
0 9070						0.89389,			
					0.9029,	0.9039,	0.9049,	0.90591,	0.90091,
0.90/91,	0.90891,				0 01602	0.91792,	a 01902	0 01002	0 02002
A 92192						0.92793,			
		0.93393,				0.92793,	0.92893,	0.92993,	0.93093,
0.93193,						0.94194,	0 9/29/	0 01301	0.94494,
0 94595						0.95195,			
0.54555,	0.95696,	0.54755,	0.94895,	0.54555,	0.55055,	0.55155,	0.55255,	0.55555,	0.55455,
0.55550,						0.96597,	0.96697.	0.96797.	0.96897.
0.96997.						0.97598,			
	0.98098,					0.37330,	0,57,050,	0,37730,	0.57050,
0,0,000,						0.98999,	0.99099.	0.99199.	0.99299.
0.99399.						1])			
							, , ,,(,,,	,	,
ĺ	0.23384,	0.23384,	0.3036, .	• • •	0,	0,	01,		
Ī	0.17488,	0.17488,	0.23333, .	• • •	0,	0,			
						0,			
- -	0.46044								
L	0.16844,	0.16844,	0.24752, .	,	0,	0,	0]]), 'Conti	dence', 'F1']	, [array([
						0, 106006, 0.01		dence', 'F1'] 08008, 0.0	
0, 0.0	0.0	02002, 0.0	03003, 0.00	0.0	05005, 0.0		07007, 0.0	08008, 0.0	09009,
0, 0.0 0.01001,	0.0	02002, 0.0 0.012012,	03003, 0.00 0.013013,	0.014014,	05005, 0.0	06006, 0.00	07007, 0.0	08008, 0.0	09009,
0, 0.0 0.01001,	0.01001, 0.0 0.011011, 0.021021,	02002, 0.0 0.012012, 0.022022,	03003, 0.00 0.013013, 0.023023,	0.014014, 0.014014,	05005, 0.0 0.015015,	06006, 0.00	07007, 0.0 0.017017,	08008, 0.0 0.018018,	09009, 0.019019,
0, 0.0 0.01001, 0.02002,	0.001001, 0.0 0.011011, 0.021021, 0.024024,	02002, 0.0 0.012012, 0.022022, 0.025025,	03003, 0.00 0.013013, 0.023023, 0.026026,	0.04004, 0.0 0.014014, 0.027027,	05005, 0.0 0.015015, 0.028028,	0.016016, 0.016016, 0.029029,	07007, 0.0 0.017017, 0.03003,	08008, 0.0 0.018018, 0.031031,	09009, 0.019019, 0.032032,
0, 0.0 0.01001, 0.02002, 0.033033,	0.001001, 0.0 0.011011, 0.021021, 0.024024,	02002, 0.0 0.012012, 0.022022, 0.025025, 0.035035,	03003, 0.00 0.013013, 0.023023, 0.026026, 0.036036,	0.014014, 0.027027, 0.037037,	05005, 0.0 0.015015, 0.028028, 0.038038,	0.016016, 0.016016,	07007, 0.0 0.017017, 0.03003,	08008, 0.0 0.018018, 0.031031,	09009, 0.019019, 0.032032,
0, 0.0 0.01001, 0.02002, 0.033033,	01001, 0.0 0.011011, 0.021021, 0.024024, 0.034034, 043043, 0.0	02002, 0.0 0.012012, 0.022022, 0.025025, 0.035035, 44044, 0.0	03003, 0.00 0.013013, 0.023023, 0.026026, 0.036036, 45045, 0.04	0.014014, 0.014014, 0.027027, 0.037037, 46046, 0.0	05005, 0.0 0.015015, 0.028028, 0.038038, 47047,	0.016016, 0.016016, 0.029029,	07007, 0.0 0.017017, 0.03003, 0.04004,	08008, 0.0 0.018018, 0.031031, 0.041041,	09009, 0.019019, 0.032032, 0.04204
0, 0.0 0.01001, 0.02002, 0.033033, 2, 0.0	01001, 0.0 0.011011, 0.021021, 0.024024, 0.034034, 043043, 0.0	02002, 0.0 0.012012, 0.022022, 0.025025, 0.035035, 44044, 0.0 0.049049,	03003, 0.00 0.013013, 0.023023, 0.026026, 0.036036, 45045, 0.04	0.014014, 0.014014, 0.027027, 0.037037, 46046, 0.0 0.051051,	05005, 0.0 0.015015, 0.028028, 0.038038, 47047, 0.052052,	0.00006, 0.00 0.016016, 0.029029, 0.039039,	07007, 0.0 0.017017, 0.03003, 0.04004,	08008, 0.0 0.018018, 0.031031, 0.041041, 0.055055,	0.019019, 0.032032, 0.04204 0.056056,
0, 0.0 0.01001, 0.02002, 0.033033, 2, 0.0	01001, 0.0 0.011011, 0.021021, 0.024024, 0.034034, 043043, 0.0	02002, 0.0 0.012012, 0.022022, 0.025025, 0.035035, 44044, 0.0 0.049049, 0.059059,	03003, 0.00 0.013013, 0.023023, 0.026026, 0.036036, 45045, 0.04 0.05005, 0.06006,	0.014014, 0.014014, 0.027027, 0.037037, 46046, 0.0 0.051051, 0.061061,	05005, 0.0 0.015015, 0.028028, 0.038038, 47047, 0.052052, 0.062062,	0.029029, 0.039039, 0.053053, 0.063063,	07007, 0.0 0.017017, 0.03003, 0.04004,	08008, 0.0 0.018018, 0.031031, 0.041041, 0.055055,	0.019019, 0.032032, 0.04204 0.056056,
0, 0.0 0.01001, 0.02002, 0.033033, 2, 0.0	001001, 0.0 0.011011, 0.021021, 0.024024, 0.034034, 043043, 0.0 0.048048, 0.058058,	02002, 0.0 0.012012, 0.022022, 0.025025, 0.035035, 44044, 0.0 0.049049, 0.059059, 68068, 0.0	03003, 0.00 0.013013, 0.023023, 0.026026, 0.036036, 45045, 0.04 0.05005, 0.06006, 69069, 0.0	0.014014, 0.027027, 0.037037, 46046, 0.051051, 0.061061, 07007, 0.0	05005, 0.0 0.015015, 0.028028, 0.038038, 47047, 0.052052, 0.062062, 71071,	0.029029, 0.039039, 0.053053, 0.063063,	07007, 0.0 0.017017, 0.03003, 0.04004, 0.054054, 0.064064,	08008, 0.0 0.018018, 0.031031, 0.041041, 0.055055, 0.065065,	09009, 0.019019, 0.032032, 0.04204 0.056056, 0.06606
0, 0.0 0.01001, 0.02002, 0.033033, 2, 0.0 0.057057, 6, 0.0	001001, 0.0 0.011011, 0.021021, 0.024024, 0.034034, 043043, 0.0 0.048048, 0.058058, 067067, 0.0	02002, 0.0 0.012012, 0.022022, 0.025025, 0.035035, 44044, 0.0 0.049049, 0.059059, 68068, 0.0 0.073073,	03003, 0.00 0.013013, 0.023023, 0.026026, 0.036036, 45045, 0.04 0.05005, 0.06006, 69069, 0.0	0.014014, 0.027027, 0.037037, 46046, 0.0 0.051051, 0.061061, 07007, 0.0	05005, 0.0 0.015015, 0.028028, 0.038038, 47047, 0.052052, 0.062062, 71071, 0.076076,	0.00006, 0.00 0.016016, 0.029029, 0.039039, 0.053053, 0.063063,	07007, 0.0 0.017017, 0.03003, 0.04004, 0.054054, 0.064064,	08008, 0.0 0.018018, 0.031031, 0.041041, 0.055055, 0.065065,	0.019019, 0.032032, 0.04204 0.056056, 0.06606 0.08008,
0, 0.0 0.01001, 0.02002, 0.033033, 2, 0.0 0.057057, 6, 0.0	001001, 0.0 0.011011, 0.021021, 0.024024, 0.034034, 043043, 0.0 0.048048, 0.058058, 067067, 0.0 0.072072, 0.082082,	02002, 0.0 0.012012, 0.022022, 0.025025, 0.035035, 44044, 0.0 0.049049, 0.059059, 68068, 0.0 0.073073, 0.083083, 92092. 0.0	03003, 0.00 0.013013, 0.023023, 0.026026, 0.036036, 45045, 0.04 0.05005, 0.06006, 69069, 0.0 0.074074, 0.084084, 93093, 0.09	0.014014, 0.027027, 0.037037, 46046, 0.0 0.051051, 0.061061, 07007, 0.0 0.075075, 0.085085, 94094, 0.0	05005, 0.0 0.015015, 0.028028, 0.038038, 47047, 0.052052, 0.062062, 71071, 0.076076, 0.086086, 95095.	0.00006, 0.00 0.016016, 0.029029, 0.039039, 0.053053, 0.063063, 0.077077, 0.087087,	07007, 0.0 0.017017, 0.03003, 0.04004, 0.054054, 0.064064, 0.078078, 0.088088,	08008, 0.0 0.018018, 0.031031, 0.041041, 0.055055, 0.065065, 0.079079, 0.089089,	09009, 0.019019, 0.032032, 0.04204 0.056056, 0.06606 0.08008, 0.0900
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0, 0.0 0.01001, 0.02002, 0.033033, 2, 0.0 0.057057, 6, 0.0 0.081081, 9, 0.0	001001, 0.0 0.011011, 0.021021, 0.024024, 0.034034, 043043, 0.0 0.048048, 0.058058, 067067, 0.0 0.072072, 0.082082, 091091, 0.0 0.096096,	02002, 0.0 0.012012, 0.022022, 0.025025, 0.035035, 44044, 0.0 0.049049, 0.059059, 68068, 0.0 0.073073, 0.083083, 92092, 0.0	03003, 0.00 0.013013, 0.023023, 0.026026, 0.036036, 45045, 0.04 0.05005, 0.06006, 69069, 0.0 0.074074, 0.084084, 93093, 0.09	0.014014, 0.014014, 0.027027, 0.037037, 46046, 0.0 0.051051, 0.061061, 07007, 0.0 0.075075, 0.085085, 94094, 0.0 0.099099,	05005, 0.0 0.015015, 0.028028, 0.038038, 47047, 0.052052, 0.062062, 71071, 0.076076, 0.086086, 95095, 0.1001,	0.006006, 0.00 0.016016, 0.029029, 0.039039, 0.053053, 0.063063,	07007, 0.0 0.017017, 0.03003, 0.04004, 0.054054, 0.064064, 0.078078, 0.088088, 0.1021,	08008, 0.0 0.018018, 0.031031, 0.041041, 0.055055, 0.065065, 0.079079, 0.089089, 0.1031,	0.019019, 0.019019, 0.032032, 0.04204 0.056056, 0.06606 0.08008, 0.0900 0.1041,
0, 0.0 0.01001, 0.02002, 0.033033, 2, 0.0 0.057057, 6, 0.0 0.081081, 9, 0.0	001001, 0.0 0.011011, 0.021021, 0.024024, 0.034034, 043043, 0.0 0.048048, 0.058058, 067067, 0.0 0.072072, 0.082082, 091091, 0.0 0.096096, 0.10611, 0.11612,	02002, 0.0 0.012012, 0.022022, 0.025025, 0.035035, 44044, 0.0 0.049049, 0.059059, 68068, 0.0 0.073073, 0.083083, 92092, 0.0 0.097097, 0.10711, 0.11712,	03003, 0.00 0.013013, 0.023023, 0.026026, 0.036036, 45045, 0.04 0.05005, 0.06006, 69069, 0.0 0.074074, 0.084084, 93093, 0.09	0.014014, 0.014014, 0.027027, 0.037037, 46046, 0.0 0.051051, 0.061061, 0.075075, 0.085085, 94094, 0.0 0.099099, 0.10911, 0.11912,	05005, 0.0 0.015015, 0.028028, 0.038038, 47047, 0.052052, 0.062062, 71071, 0.076076, 0.086086, 95095, 0.1001, 0.11011,	0.00006, 0.00 0.016016, 0.029029, 0.039039, 0.053053, 0.063063, 0.077077, 0.087087, 0.1011, 0.111111,	07007, 0.0 0.017017, 0.03003, 0.04004, 0.054054, 0.064064, 0.078078, 0.088088, 0.1021, 0.11211,	08008, 0.0 0.018018, 0.031031, 0.041041, 0.055055, 0.065065, 0.079079, 0.089089, 0.1031, 0.11311,	09009, 0.019019, 0.032032, 0.04204 0.056056, 0.06606 0.08008, 0.0900 0.1041, 0.11411,
0, 0.0 0.01001, 0.02002, 0.033033, 2, 0.0 0.057057, 6, 0.0 0.081081, 9, 0.0	001001, 0.0 0.011011, 0.021021, 0.024024, 0.034034, 043043, 0.0 0.048048, 0.058058, 07067, 0.0 0.072072, 0.082082, 091091, 0.0 0.096096, 0.10611, 0.11612, 0.12012,	02002, 0.0 0.012012, 0.022022, 0.025025, 0.035035, 44044, 0.0 0.049049, 0.059059, 68068, 0.0 0.073073, 0.083083, 92092, 0.0 0.097097, 0.10711, 0.11712, 0.12112,	03003, 0.00 0.013013, 0.023023, 0.026026, 0.036036, 45045, 0.04 0.05005, 0.06006, 69069, 0.0 0.074074, 0.084084, 93093, 0.09 0.098098, 0.10811, 0.11812, 0.12212,	0.014014, 0.014014, 0.027027, 0.037037, 46046, 0.0 0.051051, 0.061061, 0.075075, 0.085085, 94094, 0.0 0.099099, 0.10911, 0.11912, 0.12312,	05005, 0.0 0.015015, 0.028028, 0.038038, 47047, 0.052052, 0.062062, 71071, 0.076076, 0.086086, 95095, 0.1001, 0.11011, 0.12412,	0.00006, 0.00 0.016016, 0.029029, 0.039039, 0.053053, 0.063063, 0.077077, 0.087087, 0.1011, 0.11111,	07007, 0.0 0.017017, 0.03003, 0.04004, 0.054054, 0.064064, 0.078078, 0.088088, 0.1021, 0.11211, 0.12613,	08008, 0.0 0.018018, 0.031031, 0.041041, 0.055055, 0.065065, 0.079079, 0.089089, 0.1031, 0.11311,	09009, 0.019019, 0.032032, 0.04204 0.056056, 0.06606 0.08008, 0.0900 0.1041, 0.11411, 0.12813,
0, 0.0 0.01001, 0.02002, 0.033033, 2, 0.0 0.057057, 6, 0.0 0.081081, 9, 0.0 0.10511, 0.11512, 0.12913,	001001, 0.0 0.011011, 0.021021, 0.024024, 0.034034, 0.048048, 0.058058, 067067, 0.0 0.072072, 0.082082, 091091, 0.0 0.096096, 0.10611, 0.11612, 0.12012, 0.13013,	02002, 0.0 0.012012, 0.022022, 0.025025, 0.035035, 44044, 0.0 0.049049, 0.059059, 68068, 0.0 0.073073, 0.083083, 92092, 0.0 0.097097, 0.10711, 0.11712, 0.12112, 0.13113,	03003, 0.00 0.013013, 0.023023, 0.026026, 0.036036, 45045, 0.04 0.05005, 0.06006, 69069, 0.0 0.074074, 0.084084, 93093, 0.09 0.098098, 0.10811, 0.11812, 0.12212, 0.13213,	0.014014, 0.014014, 0.027027, 0.037037, 46046, 0.0 0.051051, 0.061061, 0.075075, 0.085085, 94094, 0.0 0.099099, 0.10911, 0.11912, 0.12312, 0.13313,	05005, 0.0 0.015015, 0.028028, 0.038038, 47047, 0.052052, 0.062062, 71071, 0.076076, 0.086086, 95095, 0.1001, 0.11011,	0.00006, 0.00 0.016016, 0.029029, 0.039039, 0.053053, 0.063063, 0.077077, 0.087087, 0.1011, 0.111111,	07007, 0.0 0.017017, 0.03003, 0.04004, 0.054054, 0.064064, 0.078078, 0.088088, 0.1021, 0.11211,	08008, 0.0 0.018018, 0.031031, 0.041041, 0.055055, 0.065065, 0.079079, 0.089089, 0.1031, 0.11311,	09009, 0.019019, 0.032032, 0.04204 0.056056, 0.06606 0.08008, 0.0900 0.1041, 0.11411,
0, 0.0 0.01001, 0.02002, 0.033033, 2, 0.0 0.057057, 6, 0.0 0.081081, 9, 0.0 0.10511, 0.11512,	001001, 0.0 0.011011, 0.021021, 0.024024, 0.034034, 043043, 0.0 0.048048, 0.058058, 067067, 0.0 0.072072, 0.082082, 091091, 0.0 0.096096, 0.10611, 0.11612, 0.12012, 0.13013, 0.14014,	02002, 0.0 0.012012, 0.022022, 0.025025, 0.035035, 44044, 0.0 0.049049, 0.059059, 68068, 0.0 0.073073, 0.083083, 92092, 0.0 0.097097, 0.10711, 0.11712, 0.12112,	03003, 0.00 0.013013, 0.023023, 0.026026, 0.036036, 45045, 0.04 0.05005, 0.06006, 69069, 0.0 0.074074, 0.084084, 93093, 0.09 0.098098, 0.10811, 0.11812, 0.12212,	0.014014, 0.014014, 0.027027, 0.037037, 46046, 0.0 0.051051, 0.061061, 0.075075, 0.085085, 94094, 0.0 0.099099, 0.10911, 0.11912, 0.12312, 0.13313, 0.14314,	05005, 0.0 0.015015, 0.028028, 0.038038, 47047, 0.052052, 0.062062, 71071, 0.076076, 0.086086, 95095, 0.1001, 0.11011, 0.12412, 0.13413,	0.00006, 0.00 0.016016, 0.029029, 0.039039, 0.053053, 0.063063, 0.077077, 0.087087, 0.1011, 0.11111, 0.12513, 0.13514,	07007, 0.0 0.017017, 0.03003, 0.04004, 0.054054, 0.064064, 0.078078, 0.088088, 0.1021, 0.11211, 0.12613,	08008, 0.0 0.018018, 0.031031, 0.041041, 0.055055, 0.065065, 0.079079, 0.089089, 0.1031, 0.11311,	09009, 0.019019, 0.032032, 0.04204 0.056056, 0.06606 0.08008, 0.0900 0.1041, 0.11411, 0.12813, 0.13814,
0, 0.0 0.01001, 0.02002, 0.033033, 2, 0.0 0.057057, 6, 0.0 0.081081, 9, 0.0 0.10511, 0.11512, 0.12913,	001001, 0.0 0.011011, 0.021021, 0.024024, 0.034034, 0.048048, 0.058058, 067067, 0.0 0.072072, 0.082082, 091091, 0.0 0.096096, 0.10611, 0.11612, 0.12012, 0.13013,	02002, 0.0 0.012012, 0.022022, 0.025025, 0.035035, 44044, 0.0 0.049049, 0.059059, 68068, 0.0 0.073073, 0.083083, 92092, 0.0 0.097097, 0.10711, 0.11712, 0.12112, 0.13113,	03003, 0.00 0.013013, 0.023023, 0.026026, 0.036036, 45045, 0.04 0.05005, 0.06006, 69069, 0.0 0.074074, 0.084084, 93093, 0.09 0.098098, 0.10811, 0.11812, 0.12212, 0.13213,	0.014014, 0.014014, 0.027027, 0.037037, 46046, 0.0 0.051051, 0.061061, 0.075075, 0.085085, 94094, 0.0 0.099099, 0.10911, 0.11912, 0.12312, 0.13313,	05005, 0.0 0.015015, 0.028028, 0.038038, 47047, 0.052052, 0.062062, 71071, 0.076076, 0.086086, 95095, 0.1001, 0.11011, 0.12412,	0.00006, 0.00 0.016016, 0.029029, 0.039039, 0.053053, 0.063063, 0.077077, 0.087087, 0.1011, 0.11111,	07007, 0.0 0.017017, 0.03003, 0.04004, 0.054054, 0.064064, 0.078078, 0.088088, 0.1021, 0.11211, 0.12613,	08008, 0.0 0.018018, 0.031031, 0.041041, 0.055055, 0.065065, 0.079079, 0.089089, 0.1031, 0.11311,	09009, 0.019019, 0.032032, 0.04204 0.056056, 0.06606 0.08008, 0.0900 0.1041, 0.11411, 0.12813,

0.16316,	0.16416, 0.16817,	-		0.16717, 0.17117,	Q 17217	0.17317,	0 17/17	A 17519	0.17618,
0 17719	•							0.17518,	
0.17718,	0.17818, 0.18819,		0.19019,	0.19119,	0.10210,	0.10510,	0.10410,	0.10515,	0.10019,
0.10/19,	0.19219,				0 1962	0 1972	0 1982	0.1992,	0.2002,
0 2012	,	0.2032,					0.1382,		0.21021,
0.2012,	0.21221,		0.21421,	0.20321,	0.20021,	0.20721,	0.20021,	0.20521,	0.21021,
0.21121,	0.21622,		0.21822,	0.21922,	0 22022	0.22122,	0 22222	0.22322,	0.22422,
0.22523,	0.22623,	-	0.22823,					0.23323,	
0.23524,	0.23624,	0.23724,	0.23824,	0.23924,	0.23023,	0.23123,	0.23223,	0.23323,	0.25425,
0.23324,	0.24024,		0.24224,		0 24424	0.24525,	0 24625	0 24725	0.24825,
0.24925,	-	-	0.25225,					0.25726,	
0.25926,			0.26226,	0.26326,	0.25425,	0.23320,	0.23020,	0.23720,	0.23020,
0.23320,	0.26426,				0.26827.	0.26927.	0.27027.	0.27127,	0.27227.
0.27327.	0.27427,								
0.28328,			0.28629,	0.28729,	0,1,010,	0,7,7,00,	0.10010,	0.10110,	01-00,
0.12020,	0.28829,				0.29229.	0.29329,	0.29429.	0.2953,	0.2963,
0.2973.	0.2983,	•	0.3003,					0.30531,	
0.30731,	0.30831,		0.31031,	0.31131,	,		,		,
,	0.31231,		0.31431,	-	0.31632,	0.31732,	0.31832,	0.31932,	0.32032,
0.32132,	0.32232,		0.32432,					0.32933,	-
0.33133,	-		0.33433,	0.33534,	•	•	•	•	•
	0.33634,		0.33834,	0.33934,	0.34034,	0.34134,	0.34234,	0.34334,	0.34434,
0.34535,	0.34635,	0.34735,	0.34835,					0.35335,	0.35435,
0.35536,	0.35636,	0.35736,	0.35836,	0.35936,					
	0.36036,	0.36136,	0.36236,	0.36336,	0.36436,	0.36537,	0.36637,	0.36737,	0.36837,
0.36937,	0.37037,	0.37137,	0.37237,	0.37337,	0.37437,	0.37538,	0.37638,	0.37738,	0.37838,
0.37938,	0.38038,	0.38138,	0.38238,	0.38338,					
	0.38438,	0.38539,	0.38639,	0.38739,	0.38839,	0.38939,	0.39039,	0.39139,	0.39239,
0.39339,	0.39439,	0.3954,	0.3964,	0.3974,	0.3984,	0.3994,	0.4004,	0.4014,	0.4024,
0.4034,	0.4044,	0.40541,	0.40641,	0.40741,					
	0.40841,	0.40941,	0.41041,	0.41141,	0.41241,	0.41341,	0.41441,	0.41542,	0.41642,
0.41742,	0.41842,	0.41942,	0.42042,	0.42142,	0.42242,	0.42342,	0.42442,	0.42543,	0.42643,
0.42743,	0.42843,	0.42943,	0.43043,	0.43143,					
	0.43243,	0.43343,	0.43443,	0.43544,	0.43644,	0.43744,	0.43844,	0.43944,	0.44044,
0.44144,	0.44244,	0.44344,	0.44444,	0.44545,	0.44645,	0.44745,	0.44845,	0.44945,	0.45045,
0.45145,	0.45245,	0.45345,	0.45445,	0.45546,					
	0.45646,	0.45746,	0.45846,	0.45946,	0.46046,	0.46146,	0.46246,	0.46346,	0.46446,
0.46547,	0.46647,	0.46747,	0.46847,	0.46947,	0.47047,	0.47147,	0.47247,	0.47347,	0.47447,
0.47548,	0.47648,	0.47748,	0.47848,	0.47948,					
	0.48048,	0.48148,	0.48248,	0.48348,	0.48448,	0.48549,	0.48649,	0.48749,	0.48849,

0.48949,	0.49049,	0.49149,	0.49249,	0.49349,	0.49449,	0.4955,	0.4965,	0.4975,	0.4985,
0.4995,	0.5005,	0.5015,	0.5025,	0.5035,	0 E00E1	0 50051	0 51051	A E11E1	0 51351
Q E13E1	0.5045,		0.50651,	· .			0.51051,		0.51251,
0.51351,		0.51552,	0.51652,	0.51752,	0.51852,	0.51952,	0.52052,	0.52152,	0.52252,
0.52352,	0.52452,	0.52553,	0.52653,	0.52753,	0 53353	0 53353	0 52452	0 52554	0 53654
0 52754	0.52853,	0.52953,	0.53053,	0.53153,		0.53353,			0.53654,
0.53754,	0.53854,	0.53954,	0.54054,	0.54154,	0.54254,	0.54354,	0.54454,	0.54555,	0.54655,
0.54755,	0.54855,	0.54955,	0.55055,	0.55155,	0 55656	0	0 55056	0 55056	0.56056
	0.55255,	0.55355,	0.55455,	0.55556,		0.55756,			0.56056,
0.56156,	0.56256,	0.56356,	0.56456,		0.56657,	0.56757,	0.56857,	0.56957,	0.57057,
0.57157,	0.57257,	0.57357,	0.57457,	0.57558,					
	0.57658,	0.57758,	0.57858,	0.57958,		0.58158,			0.58458,
0.58559,	0.58659,	0.58759,	0.58859,	0.58959,	0.59059,	0.59159,	0.59259,	0.59359,	0.59459,
0.5956,	0.5966,	0.5976,	0.5986,	0.5996,					
	0.6006,	0.6016,		0.6036,					0.60861,
0.60961,	0.61061,	0.61161,	0.61261,	0.61361,	0.61461,	0.61562,	0.61662,	0.61762,	0.61862,
0.61962,	0.62062,	0.62162,	0.62262,	0.62362,					
	0.62462,	0.62563,	0.62663,	0.62763,	0.62863,	0.62963,	0.63063,	0.63163,	0.63263,
0.63363,	0.63463,	0.63564,	0.63664,	0.63764,	0.63864,	0.63964,	0.64064,	0.64164,	0.64264,
0.64364,	0.64464,	0.64565,	0.64665,	0.64765,					
	0.64865,	0.64965,	0.65065,	0.65165,	0.65265,	0.65365,	0.65465,	0.65566,	0.65666,
0.65766,	0.65866,	0.65966,	0.66066,	0.66166,	0.66266,	0.66366,	0.66466,	0.66567,	0.66667,
0.66767,	0.66867,	0.66967,	0.67067,	0.67167,					
	0.67267,	0.67367,	0.67467,	0.67568,	0.67668,	0.67768,	0.67868,	0.67968,	0.68068,
0.68168,	0.68268,	0.68368,	0.68468,	0.68569,	0.68669,	0.68769,	0.68869,	0.68969,	0.69069,
0.69169,	0.69269,	0.69369,	0.69469,	0.6957,					
	0.6967,	0.6977,	0.6987,	0.6997,	0.7007,	0.7017,	0.7027,	0.7037,	0.7047,
0.70571,	0.70671,	0.70771,	0.70871,	0.70971,	0.71071,	0.71171,	0.71271,	0.71371,	0.71471,
0.71572,	0.71672,	0.71772,	0.71872,	0.71972,					
	0.72072,	0.72172,	0.72272,	0.72372,	0.72472,	0.72573,	0.72673,	0.72773,	0.72873,
0.72973,	0.73073,	0.73173,	0.73273,					0.73774,	
0.73974,	0.74074,	0.74174,	0.74274,	0.74374,	•	•	•	•	•
,	0.74474,	•	0.74675,	0.74775,	0.74875,	0.74975,	0.75075,	0.75175,	0.75275,
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0.76376,	0.76476,	0.76577,	0.76677,	0.76777,	,	,	,	,	,
,	0.76877,	0.76977,	0.77077,	0.77177,	0.77277,	0.77377,	0.77477,	0.77578,	0.77678,
0.77778,	0.77878,	0.77978,	0.78078,	0.78178,	0.78278,	0.78378,	0.78478,	0.78579,	0.78679,
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,	0.79279,	0.79379,	0.79479,	0.7958,	0.7968,	0.7978,	0.7988,	0.7998,	0.8008,
0.8018,	0.8028,	0.8038,	0.8048,	0.80581,	0.80681,	0.80781,	0.80881,	0.80981,	0.81081,
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0.85986,		0.86186,		0.86386,	,	,	,	,	,
					0.86887,	0.86987,	0.87087,	0.87187,	0.87287,
0.87387,	0.87487,	0.87588,	0.87688,	0.87788,	0.87888,	0.87988,	0.88088,	0.88188,	0.88288,
0.88388,	0.88488,	0.88589,	0.88689,	0.88789,					
						0.89389,			
0.8979,	0.8989,	0.8999,	0.9009,	0.9019,	0.9029,	0.9039,	0.9049,	0.90591,	0.90691,
		0.90991,							
	0.91291,	0.91391,	0.91491,	0.91592,	0.91692,	0.91792,	0.91892,	0.91992,	0.92092,
0.92192,	0.92292,	0.92392,	0.92492,	0.92593,	0.92693,	0.92793,	0.92893,	0.92993,	0.93093,
0.93193,		0.93393,							
	0.93694,	0.93794,	0.93894,	0.93994,	0.94094,	0.94194,	0.94294,	0.94394,	0.94494,
0.94595,	0.94695,	0.94795,	0.94895,	0.94995,	0.95095,	0.95195,	0.95295,	0.95395,	0.95495,
0.95596,		0.95796,							
	0.96096,	0.96196,	0.96296,	0.96396,	0.96496,	0.96597,	0.96697,	0.96797,	0.96897,
					0.97497,	0.97598,	0.97698,	0.97798,	0.97898,
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0.11512,	0.12012,	-	0.12212,	0.11912,	Q 12/12	0.12513,	0 12612	0 12712	A 12012
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0.15914,	0.14414,	0.14515,	0.14615,		Q 1/Q15	0.14915,	0 15015	0 15115	0.15215,
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0.17718, 0.18719,		0.17918,	0.18018,		0.10210,	0.18318,	0.10410,	0.10319,	0.10019,
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0.23524,	0.23624,		0.23824,	0.23924,	0 24424	0 24525	0.24625	0 24725	0 24025
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0.25926,	0.26026,	0.26126,	0.26226,	0.26326,	0 26027	0.26027	0 27027	0 27127	0 27227
0 27227	0.26426,		0.26627,			0.26927,			0.27227,
	0.27427,				0.2/828,	0.27928,	0.28028,	0.28128,	0.28228,
0.28328,	0.28428,	0.28529,	0.28629,	0.28729,			0.00400	0.0050	0.0063
	0.28829,	0.28929,	0.29029,			0.29329,			0.2963,
	0.2983,	0.2993,	0.3003,	0.3013,	0.3023,	0.3033,	0.3043,	0.30531,	0.30631,
0.30731,	0.30831,	0.30931,	0.31031,	0.31131,					
	0.31231,	0.31331,	0.31431,			0.31732,			0.32032,
0.32132,	0.32232,	0.32332,	0.32432,		0.32633,	0.32733,	0.32833,	0.32933,	0.33033,
0.33133,	0.33233,	0.33333,	0.33433,	0.33534,					
	0.33634,	•	0.33834,			0.34134,			0.34434,
	0.34635,		0.34835,		0.35035,	0.35135,	0.35235,	0.35335,	0.35435,
0.35536,			0.35836,	0.35936,					
		0.36136,				0.36537,			0.36837,
		0.37137,			0.37437,	0.37538,	0.37638,	0.37738,	0.37838,
0.37938,	0.38038,	0.38138,	0.38238,	0.38338,					
	0.38438,	0.38539,	0.38639,	0.38739,				•	0.39239,
0.39339,	0.39439,	0.3954,	0.3964,	0.3974,	0.3984,	0.3994,	0.4004,	0.4014,	0.4024,
0.4034,	0.4044,	•	0.40641,	0.40741,					
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		0.41942,		0.42142,	0.42242,	0.42342,	0.42442,	0.42543,	0.42643,
0.42743,	0.42843,	0.42943,	0.43043,	0.43143,					

0.44144, 0.45145,	0.43243, 0.44244, 0.45245,	•	0.43443, 0.44444, 0.45445,	0.43544, 0.44545, 0.45546,	-		0.43844, 0.44845,		0.44044, 0.45045,
0.45145,	0.45646,	0.45746,	0.45846,	0.45946,	0.46046,	0.46146,	0.46246,	0.46346,	0.46446,
0.46547,	0.46647,		0.46847,	0.46947,			0.47247,		0.47447,
0.47548,	0.47648,	0.47748,	0.47848,	0.47948,					
	0.48048,	0.48148,	0.48248,	0.48348,	0.48448,	0.48549,	0.48649,	0.48749,	0.48849,
0.48949,	0.49049,	0.49149,	0.49249,	0.49349,	0.49449,	0.4955,	0.4965,	0.4975,	0.4985,
0.4995,	0.5005,	0.5015,	0.5025,	0.5035,					
	0.5045,	0.50551,	0.50651,	0.50751,	0.50851,	0.50951,	0.51051,	0.51151,	0.51251,
0.51351,	0.51451,	0.51552,	0.51652,	0.51752,	0.51852,	0.51952,	0.52052,	0.52152,	0.52252,
0.52352,	0.52452,	0.52553,	0.52653,	0.52753,					
	0.52853,	0.52953,	0.53053,	0.53153,	0.53253,	0.53353,	0.53453,	0.53554,	0.53654,
0.53754,	0.53854,	0.53954,	0.54054,	0.54154,	0.54254,	0.54354,	0.54454,	0.54555,	0.54655,
0.54755,	0.54855,	0.54955,	0.55055,	0.55155,					
	0.55255,	0.55355,	0.55455,	0.55556,	0.55656,	0.55756,	0.55856,	0.55956,	0.56056,
0.56156,	0.56256,	0.56356,	0.56456,	0.56557,	0.56657,	0.56757,	0.56857,	0.56957,	0.57057,
0.57157,	0.57257,	0.57357,	0.57457,	0.57558,					
	0.57658,	0.57758,	0.57858,	0.57958,	0.58058,	0.58158,	0.58258,	0.58358,	0.58458,
0.58559,	0.58659,	0.58759,	0.58859,	0.58959,	0.59059,	0.59159,	0.59259,	0.59359,	0.59459,
0.5956,	0.5966,	0.5976,	0.5986,	0.5996,					
	0.6006,	0.6016,	0.6026,	0.6036,	0.6046,	0.60561,	0.60661,	0.60761,	0.60861,
0.60961,	0.61061,	0.61161,	0.61261,	0.61361,	0.61461,	0.61562,	0.61662,	0.61762,	0.61862,
0.61962,	0.62062,	0.62162,	0.62262,	0.62362,					
	0.62462,	0.62563,	0.62663,	0.62763,	0.62863,	0.62963,	0.63063,	0.63163,	0.63263,
0.63363,	0.63463,	0.63564,	0.63664,	0.63764,	0.63864,	0.63964,	0.64064,	0.64164,	0.64264,
0.64364,	0.64464,	0.64565,	0.64665,	0.64765,					
	0.64865,	0.64965,	0.65065,	0.65165,			0.65465,		0.65666,
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0.66767,	0.66867,	0.66967,	0.67067,	0.67167,					
	0.67267,	0.67367,	0.67467,	0.67568,	0.67668,	0.67768,	0.67868,	0.67968,	0.68068,
0.68168,	0.68268,	0.68368,	0.68468,	0.68569,	0.68669,	0.68769,	0.68869,	0.68969,	0.69069,
0.69169,	0.69269,	0.69369,	0.69469,	0.6957,					
	0.6967,	0.6977,	0.6987,	0.6997,	0.7007,	0.7017,	0.7027,	0.7037,	0.7047,
0.70571,	0.70671,	0.70771,	0.70871,	0.70971,	0.71071,	0.71171,	0.71271,	0.71371,	0.71471,
0.71572,	0.71672,	0.71772,	0.71872,	0.71972,					
	0.72072,	-	0.72272,	0.72372,			0.72673,		0.72873,
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0.99399,
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0.99336, ...,
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                                                                                           01,
                                                                                           0]]), 'Confidence', 'Recall']]
            0.98592,
                          0.98592,
                                       0.98056, ...,
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                                                                              0,
fitness: 0.6754164396458071
keys: ['metrics/precision(B)', 'metrics/recall(B)', 'metrics/mAP50(B)', 'metrics/mAP50-95(B)']
maps: array([
                 0.78062,
                               0.66612,
                                            0.44801,
                                                           0.7023,
                                                                       0.646571)
names: {0: 'Open Eye', 1: 'Closed Eye', 2: 'Cigarette', 3: 'Phone', 4: 'Seatbelt'}
plot: True
results dict: {'metrics/precision(B)': 0.8984985997827405, 'metrics/recall(B)': 0.8451070395992005, 'metrics/mAP50(B)': 0.915
```

```
6467185023756, 'metrics/mAP50-95(B)': 0.6487241864395217, 'fitness': 0.6754164396458071} save_dir: PosixPath('runs/detect/train') speed: {'preprocess': 0.12427146787072585, 'inference': 1.4714868361104627, 'loss': 0.0005749390683148185, 'postprocess': 0.9 222796094023368} task: 'detect'
```

Eddy