RESULTAT AVEC LE DATASET COCO2018 ET LE MODÈLE YOLOV5
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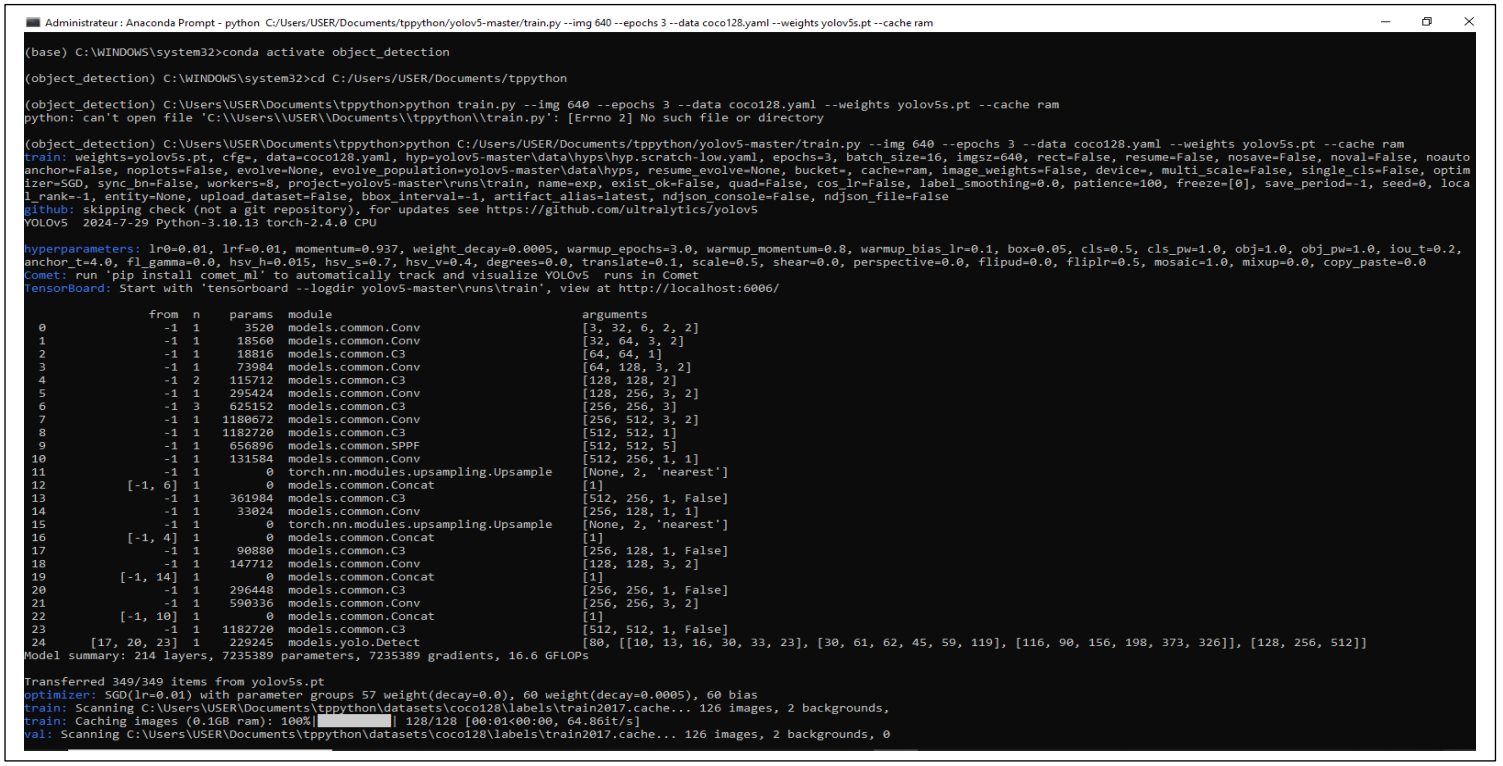
Méthodologie

1- **Préparation des données :** Le jeu de données COCO128 contient 128 images annotées avec des objets appartenant à plusieurs catégories. Les annotations sont fournies au format JSON, qui est converti au format YOLO pour l'entraînement.
2- **Configuration du modèle :** YOLOv5 est configuré avec les hyperparamètres suivants : 50 époques, une taille d'image de 640 pixels, et une taille de lot de 16. Le modèle est initialisé avec des poids pré-entraînés sur COCO.
3- **Entraînement :** Le modèle est entraîné sur le jeu de données COCO128 avec un optimiseur SGD. Des techniques d'augmentation des données comme le retournement, la rotation et le mise à l'échelle sont utilisées pour améliorer la robustesse du modèle.
4- **Évaluation :** La performance du modèle est réalisée en termes de mAP (mean Average Precision) sur les images du jeu de données COCO128.

IMPLEMENTATION

1-entraînement du modèle



```
Transferred 349/349 items from yolov5s.pt
optimizer: SGD(lr=0.01) with parameter groups 57 weight(decay=0.0), 60 weight(decay=0.0005), 60 bias
train: Scanning C:\Users\USER\Documents\tppython\datasets\coco128\labels\train2017.cache... 126 images, 2 backgrounds,
train: Caching images (0.1GB ram): 100%| | 128/128 [00:01<00:00, 64.86it/s]
val: Scanning C:\Users\USER\Documents\tppython\datasets\coco128\labels\train2017.cache... 126 images, 2 backgrounds, 0
val: Caching images (0.1GB ram): 100%| | 128/128 [00:00<00:00, 390.25it/s]

AutoAnchor: 4.27 anchors/target, 0.994 Best Possible Recall (BPR). Current anchors are a good fit to dataset
Plotting labels to yolov5-master\runs\train\exp14\labels.jpg...
C:\Users\USER\Documents\tppython\yolov5-master\train.py:355: FutureWarning: `torch.cuda.amp.GradScaler(args...)` is deprecated. Please use `torch.amp.GradScaler('cuda', args...)` instead.
  scaler = torch.cuda.amp.GradScaler(enabled=amp)
Image sizes 640 train, 640 val
Using 4 dataloader workers
Logging results to yolov5-master\runs\train\exp14
Starting training for 3 epochs...

     Epoch    GPU_mem   box_loss   obj_loss   cls_loss  Instances       Size
  0%|          | 0/8 [00:00<?, ?it/s]C:\Users\USER\Documents\tppython\yolov5-master\train.py:412: FutureWarning: `torch.cuda.amp.autocast(args...)` is deprecated. Please use `torch.amp.autocast('cu
da', args...)` instead.
  with torch.cuda.amp.autocast(amp):
       0/2        0G    0.04429    0.06439    0.01391       197       640:  12%|▉       | 1/8 [16:48<1:57:36, 1008.02s/it]C:\Users\USER\Documents\tppython\yolov5-master\train.py:412: FutureWa
rning: `torch.cuda.amp.autocast(args...)` is deprecated. Please use `torch.amp.autocast('cuda', args...)` instead.
  with torch.cuda.amp.autocast(amp):
       0/2        0G    0.04407    0.05901    0.01749       154       640:  25%|██      | 2/8 [1:12:13<3:57:05, 2370.86s/it]C:\Users\USER\Documents\tppython\yolov5-master\train.py:412: Future
Warning: `torch.cuda.amp.autocast(args...)` is deprecated. Please use `torch.amp.autocast('cuda', args...)` instead.
  with torch.cuda.amp.autocast(amp):
       0/2        0G    0.04451    0.05735    0.01674       150       640:  38%|███▊    | 3/8 [1:13:09<1:49:31, 1314.26s/it]C:\Users\USER\Documents\tppython\yolov5-master\train.py:412: Future
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  with torch.cuda.amp.autocast(amp):
       0/2        0G    0.04477    0.06103    0.01689       248       640:  50%|████    | 4/8 [1:13:58<54:18, 814.57s/it]   C:\Users\USER\Documents\tppython\yolov5-master\train.py:412: Future
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  with torch.cuda.amp.autocast(amp):
       0/2        0G    0.04414    0.05842    0.01644       157       640:  62%|████▉   | 5/8 [1:14:45<26:53, 537.77s/it]C:\Users\USER\Documents\tppython\yolov5-master\train.py:412: FutureWar
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  with torch.cuda.amp.autocast(amp):
```

- Epoch 0/2

```
Logging results to yolov5-master\runs\train\exp14
Starting training for 3 epochs...

     Epoch    GPU_mem   box_loss   obj_loss   cls_loss  Instances       Size
  0%|          | 0/8 [00:00<?, ?it/s]C:\Users\USER\Documents\tppython\yolov5-master\train.py:412: FutureWarning: `torch.cuda.amp.autocast(args...)` is deprecated. Please use `torch.amp.autocast('cu
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       0/2        0G    0.04451    0.05735    0.01674       150       640:  38%|███▊    | 3/8 [1:13:09<1:49:31, 1314.26s/it]C:\Users\USER\Documents\tppython\yolov5-master\train.py:412: Future
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       0/2        0G    0.04477    0.06103    0.01689       248       640:  50%|████    | 4/8 [1:13:58<54:18, 814.57s/it]   C:\Users\USER\Documents\tppython\yolov5-master\train.py:412: Future
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       0/2        0G    0.04414    0.05842    0.01644       157       640:  62%|████▉   | 5/8 [1:14:45<26:53, 537.77s/it]C:\Users\USER\Documents\tppython\yolov5-master\train.py:412: FutureWar
ning: `torch.cuda.amp.autocast(args...)` is deprecated. Please use `torch.amp.autocast('cuda', args...)` instead.
  with torch.cuda.amp.autocast(amp):
       0/2        0G    0.04414    0.05835    0.01667       189       640:  75%|█████▉  | 6/8 [1:15:29<12:20, 370.10s/it]C:\Users\USER\Documents\tppython\yolov5-master\train.py:412: FutureWar
ning: `torch.cuda.amp.autocast(args...)` is deprecated. Please use `torch.amp.autocast('cuda', args...)` instead.
  with torch.cuda.amp.autocast(amp):
       0/2        0G    0.04468    0.05868    0.01669       187       640:  88%|██████▉ | 7/8 [1:16:11<04:22, 262.60s/it]C:\Users\USER\Documents\tppython\yolov5-master\train.py:412: FutureWar
ning: `torch.cuda.amp.autocast(args...)` is deprecated. Please use `torch.amp.autocast('cuda', args...)` instead.
  with torch.cuda.amp.autocast(amp):
       0/2        0G    0.04437    0.05843    0.01733       164       640: 100%|████████| 8/8 [1:16:54<00:00, 576.83s/it]
               Class     Images  Instances          P          R      mAP50   mAP50-95:   0%|          | 0/4 [00:00<?, ?it/s]WARNING  NMS time limit 2.100s exceeded
               Class     Images  Instances          P          R      mAP50   mAP50-95: 100%|████████| 4/4 [01:54<00:00, 28.65s/it]
                 all        128        929      0.631      0.526      0.579      0.377
```
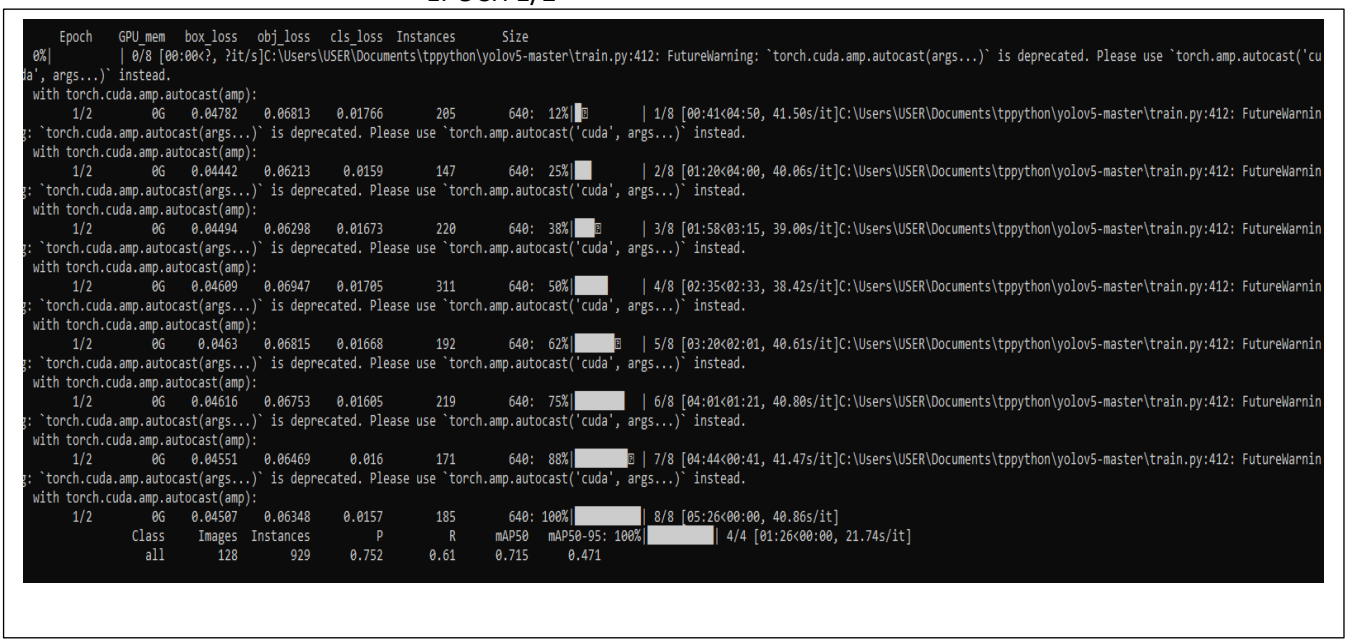
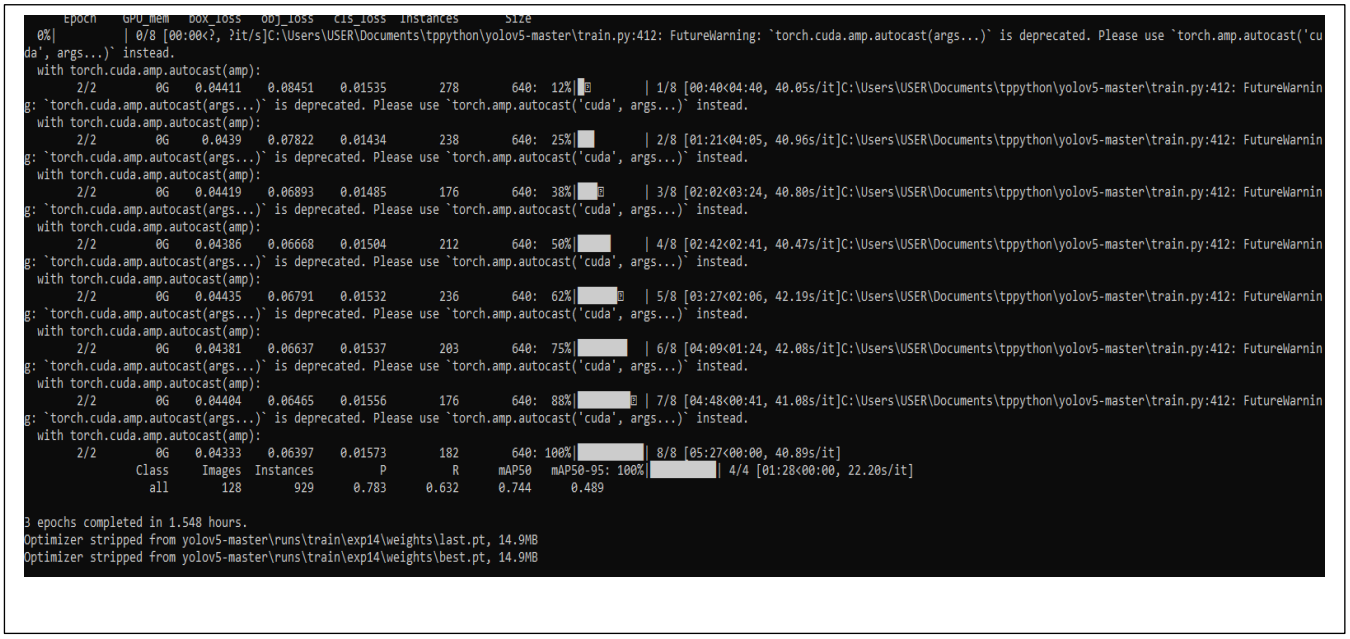

- EPOCH 1/2



- EPOCH 2/2



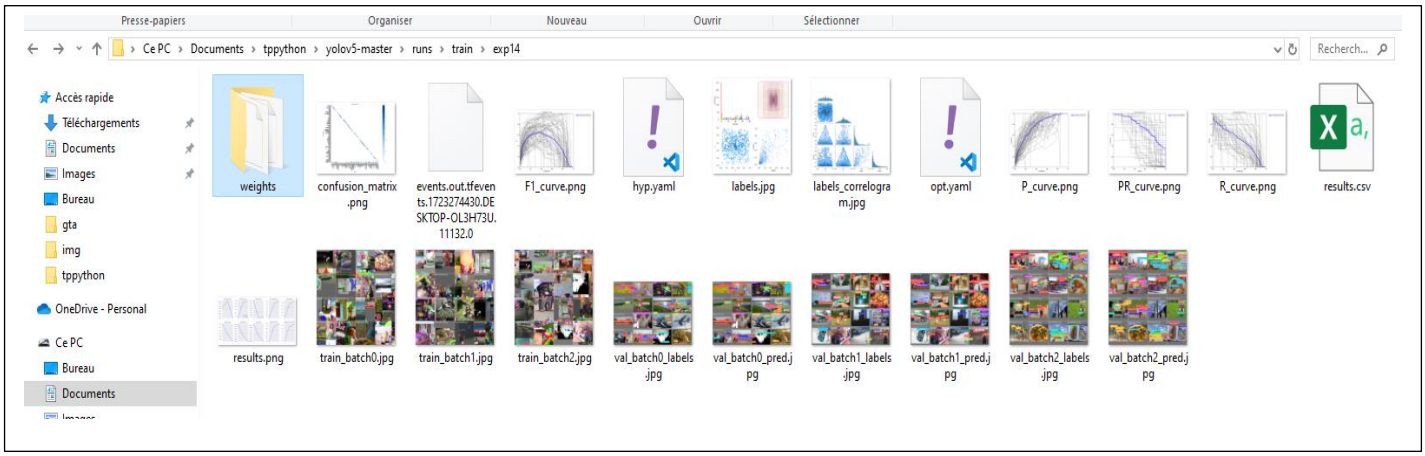
VALIDATION

```
3 epochs completed in 1.548 hours.
Optimizer stripped from yolov5-master\runs\train\exp14\weights\last.pt, 14.9MB
Optimizer stripped from yolov5-master\runs\train\exp14\weights\best.pt, 14.9MB

Validating yolov5-master\runs\train\exp14\weights\best.pt...
Fusing layers...
Model summary: 157 layers, 7225885 parameters, 0 gradients, 16.4 GFLOPs
```

Class	Images	Instances	P	R	mAP50	mAP50-95: 100%| | 4/4 [01:24<00:00, 21.01s/it]
all	128	929	0.781	0.633	0.744	0.489
person	128	254	0.895	0.704	0.806	0.531
bicycle	128	6	0.767	0.557	0.725	0.428
car	128	46	0.752	0.37	0.549	0.229
motorcycle	128	5	0.56	0.8	0.845	0.64
airplane	128	6	1	0.994	0.995	0.7
bus	128	7	0.649	0.714	0.788	0.697
train	128	3	0.673	0.333	0.753	0.479
truck	128	12	0.698	0.417	0.498	0.279
boat	128	6	0.949	0.333	0.528	0.217
traffic light	128	14	0.759	0.227	0.374	0.208
stop sign	128	2	0.815	1	0.995	0.821
bench	128	9	0.824	0.526	0.628	0.259
bird	128	16	0.963	1	0.995	0.672
cat	128	4	0.886	1	0.995	0.772
dog	128	9	0.993	0.667	0.893	0.639
horse	128	2	0.863	1	0.995	0.622
elephant	128	17	0.916	0.882	0.937	0.708
bear	128	1	0.698	1	0.995	0.995
zebra	128	4	0.842	1	0.995	0.905
giraffe	128	9	0.78	0.788	0.908	0.702
backpack	128	6	0.72	0.5	0.739	0.31
umbrella	128	18	0.864	0.709	0.869	0.503
handbag	128	19	0.79	0.2	0.344	0.171
tie	128	7	0.826	0.684	0.764	0.485
suitcase	128	4	0.881	1	0.995	0.588
frisbee	128	5	0.722	0.8	0.8	0.67
skis	128	1	0.839	1	0.995	0.115
snowboard	128	7	0.819	0.652	0.828	0.538
sports ball	128	6	0.66	0.667	0.602	0.31
kite	128	10	0.702	0.474	0.589	0.213
baseball bat	128	4	1	0.494	0.544	0.213
baseball glove	128	7	0.543	0.429	0.466	0.309
skateboard	128	5	1	0.59	0.715	0.476
tennis racket	128	7	0.76	0.429	0.538	0.32
bottle	128	18	0.567	0.365	0.54	0.267
wine glass	128	16	0.757	0.875	0.914	0.499
cup	128	36	0.806	0.556	0.781	0.521
fork	128	6	1	0.326	0.452	0.311
knife	128	16	0.778	0.659	0.717	0.398
spoon	128	22	0.841	0.481	0.631	0.383
bowl	128	28	0.841	0.536	0.711	0.515
banana	128	1	0.872	1	0.995	0.205
sandwich	128	2	1	0	0.662	0.579
orange	128	4	1	0.958	0.995	0.604
broccoli	128	11	0.635	0.364	0.436	0.33
carrot	128	24	0.69	0.583	0.693	0.469
hot dog	128	2	0.393	1	0.995	0.92
pizza	128	5	0.809	0.8	0.962	0.701
donut	128	14	0.651	1	0.961	0.826
cake	128	4	0.857	1	0.995	0.822
chair	128	35	0.567	0.599	0.619	0.328
couch	128	6	0.884	0.667	0.822	0.546
potted plant	128	14	0.732	0.786	0.821	0.468
bed	128	3	0.885	0.333	0.83	0.455
dining table	128	13	0.817	0.346	0.582	0.363
toilet	128	2	1	0.98	0.995	0.846
tv	128	2	0.569	1	0.995	0.746
laptop	128	3	1	0	0.592	0.311
mouse	128	2	1	0	0.106	0.0531
remote	128	8	1	0.624	0.635	0.539
cell phone	128	8	0.654	0.375	0.435	0.216
microwave	128	3	0.773	1	0.995	0.733
oven	128	5	0.329	0.4	0.448	0.264
sink	128	6	0.498	0.333	0.346	0.246
refrigerator	128	5	0.551	0.8	0.798	0.559
book	128	29	0.627	0.233	0.361	0.162
clock	128	9	0.778	0.889	0.932	0.755
vase	128	2	0.353	1	0.995	0.895
scissors	128	1	1	0	0.497	0.0498
teddy bear	128	21	0.844	0.517	0.763	0.512
toothbrush	128	5	0.711	0.6	0.853	0.576

```
Results saved to yolov5-master\runs\train\exp14
```

On constate que le résultat est stocké dans le répertoire train avec pour chemin d'accès 'Results saved to yolov5-master\runs\train\exp14'

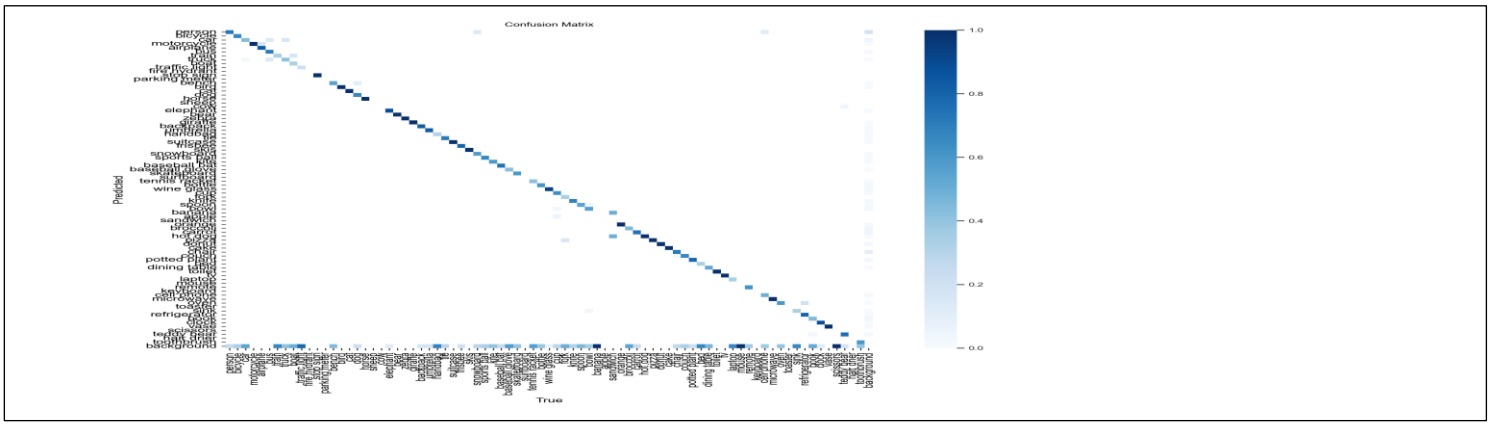


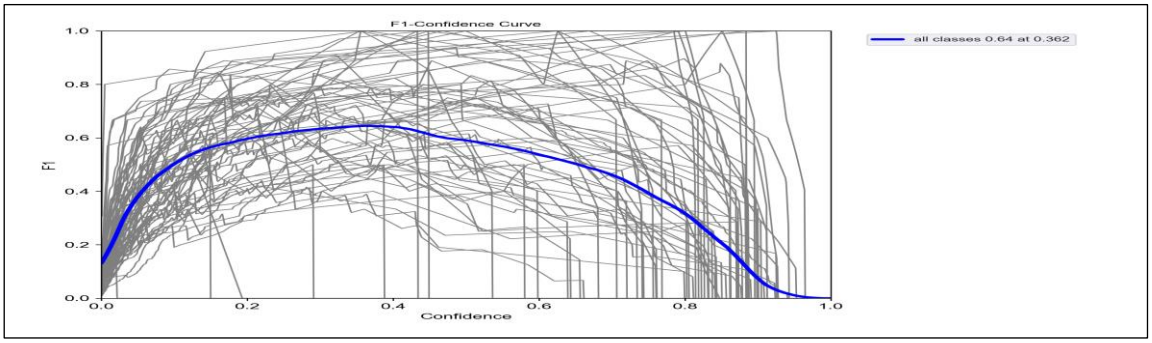
RÉSULTATS :

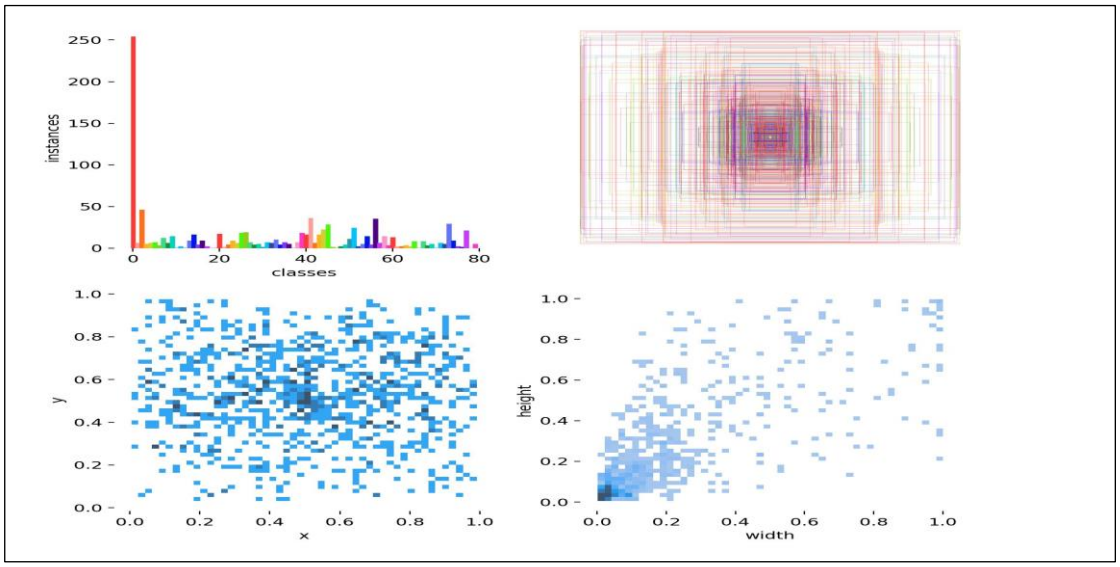
1- Métriques

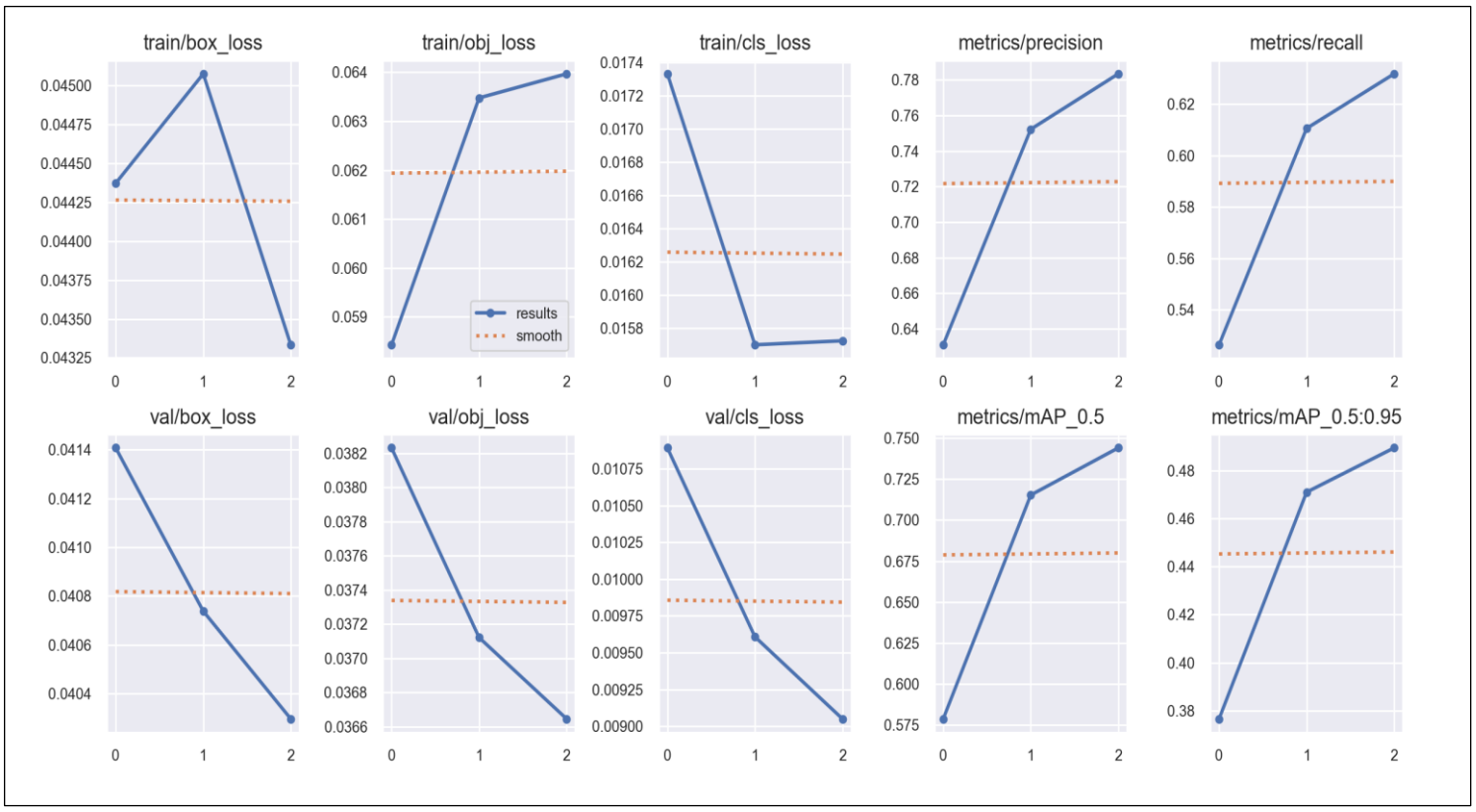
epoch,	train/box_loss,	train/obj_loss,	train/cls_loss,	metrics/precision,	metrics/recall,	metrics/mAP_0.5,metrics/mAP_0.5:0.95,	val/box_loss,	val/obj_loss,	val/cls_loss,	x/lr0,	x/lr1,	x/lr2
0,	0.044372,	0.058429,	0.017331,	0.63095,	0.52644,	0.57865,	0.37662,	0.041408,	0.038231,	0.010893,	0.0937,	0.0007,	0.0007
1,	0.045075,	0.063476,	0.015702,	0.7522,	0.61049,	0.71532,	0.471,	0.040738,	0.037121,	0.0096083,	0.086005,	0.001005,	0.001005
2,	0.043334,	0.063968,	0.015726,	0.78337,	0.63168,	0.74408,	0.48942,	0.040296,	0.036645,	0.00905,	0.077782,	0.000782,	0.000782

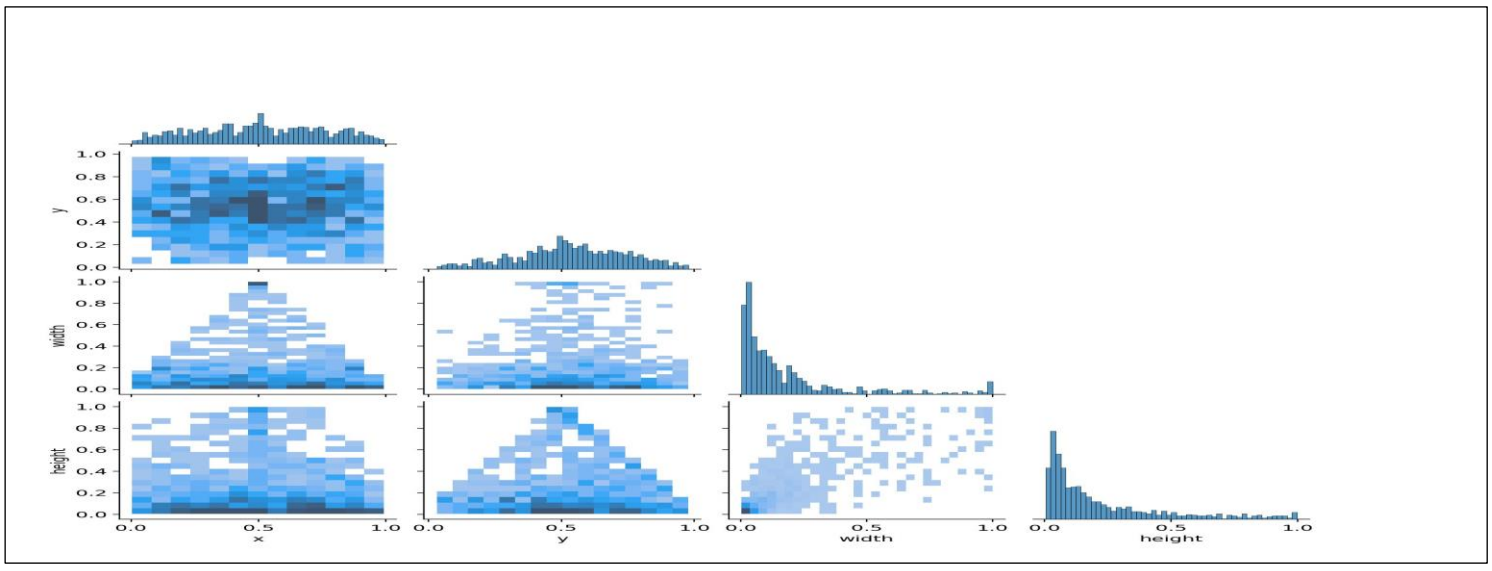
2- Graphiques

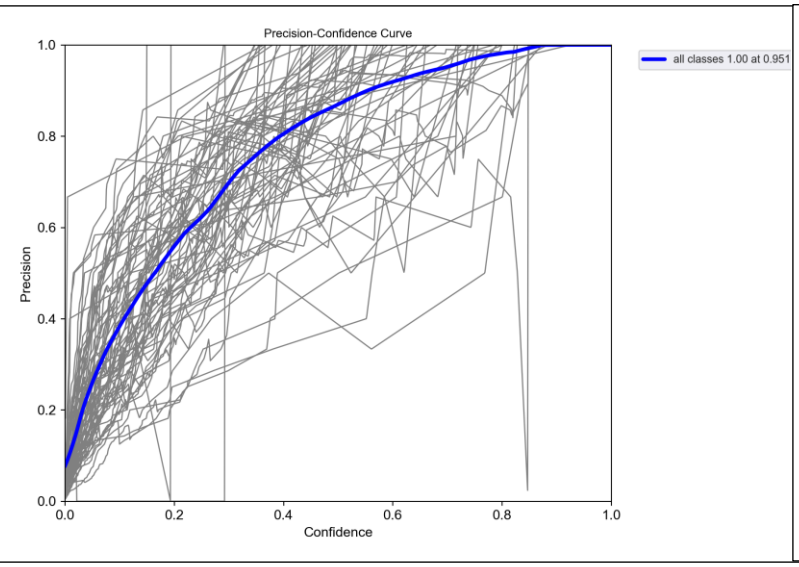


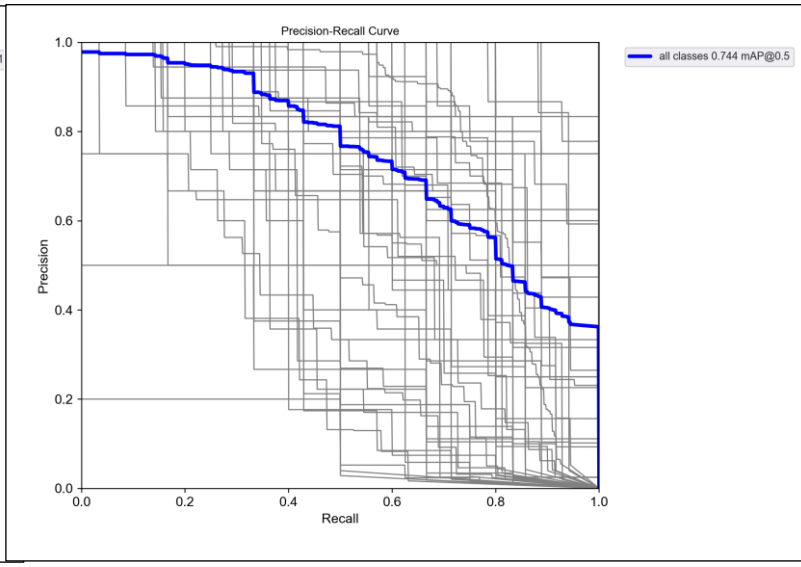



instances
classes
x
y
width
height

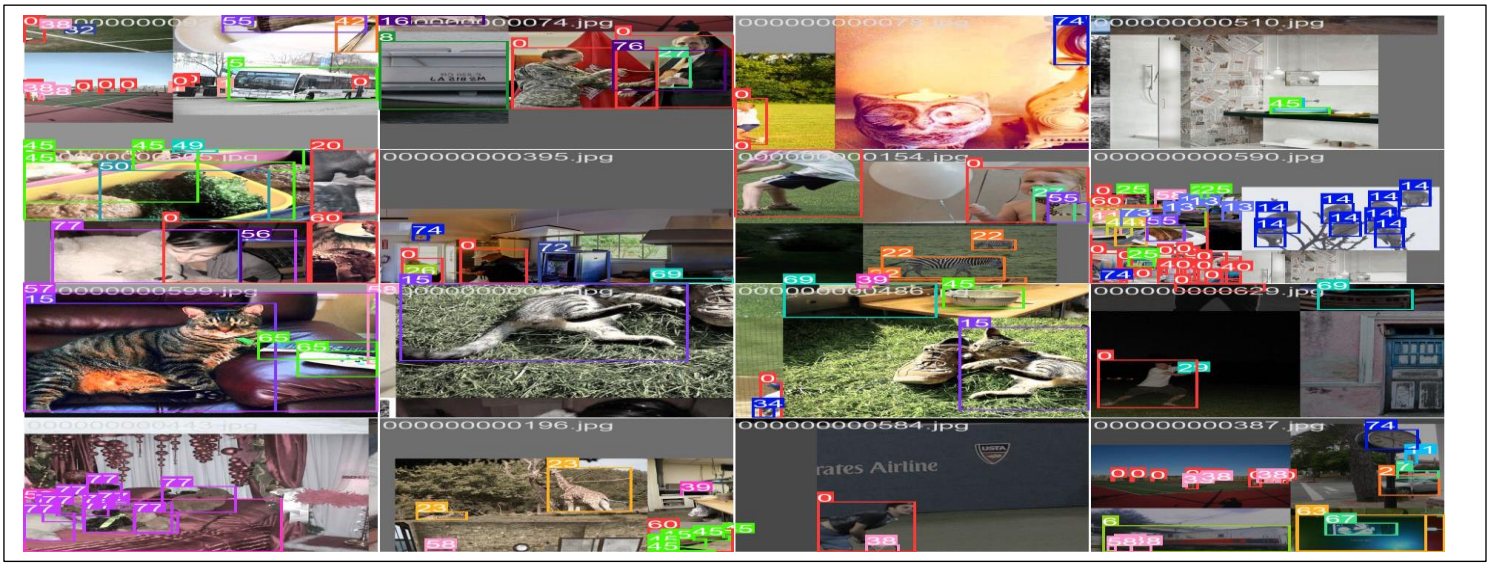

train/box_loss
train/obj_loss
train/cls_loss
metrics/precision
metrics/recall
val/box_loss
val/obj_loss
val/cls_loss
metrics/mAP_0.5
metrics/mAP_0.5:0.95
results
smooth


x
y
width
height

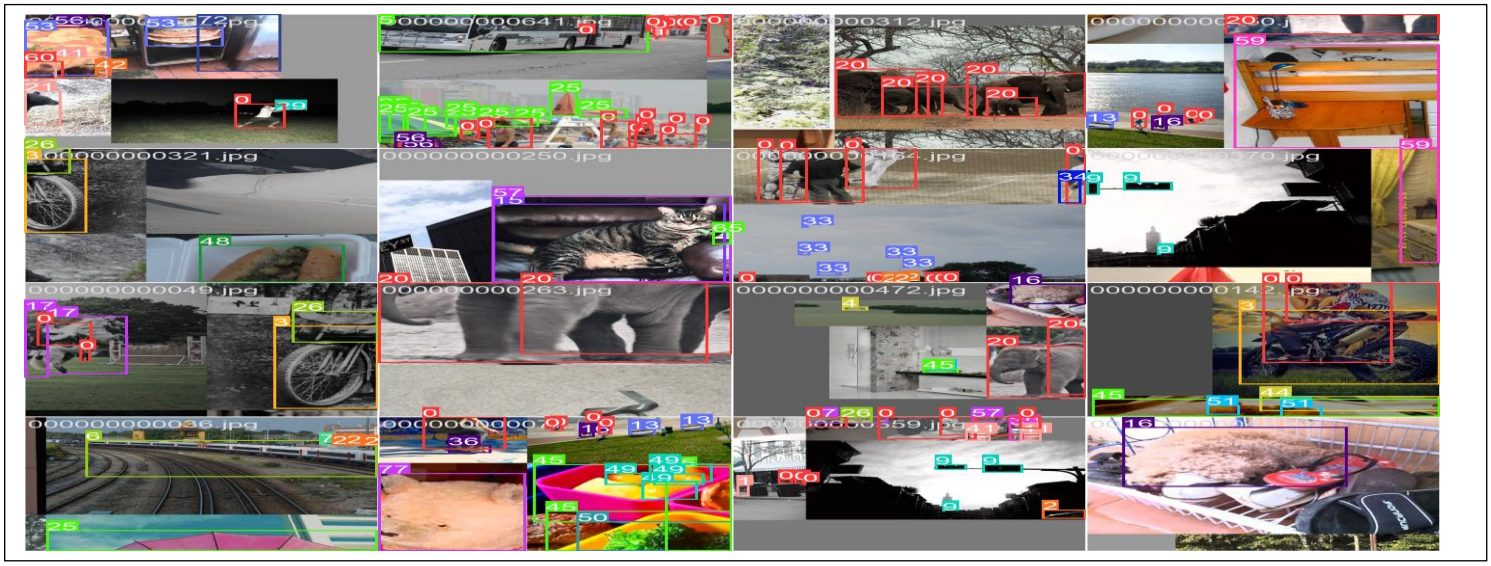




Train batch 0/2



Train batch 1/2



Train batch 2/2

Validation

Référence : 1- Documentation Ultralytics YOLOv5. (nd). https://docs.ultralytics.com

2- Ensemble de données COCO. (nd). Objets communs en contexte. http://cocodataset.org