YOLO MODEL PERFORMANCE METRICS – combined dataset

Yolov8s

```
val: Fast image access ✅ (ping: 2.1±3.2 ms, read: 213.6±186.8 MB/s, size: 1996.2
KB)
val: Scanning /content/drive/MyDrive/Colab
Notebooks/combined_dataset/val/labels.cache... 82 images, 2 backgrounds, 0 corrupt:
100% ━━━━━━━━━━━━ 82/82 91.2Kit/s 0.0s
                 Class     Images  Instances      Box(P          R      mAP50
mAP50-95): 100% ━━━━━━━━━━━━ 3/3 0.5it/s 6.1s
                   all         82        253      0.886       0.81      0.845
0.594
                 books          9        153      0.992      0.841      0.973
0.726
               monitor         46         50      0.902      0.923      0.936
0.891
          office-chair         23         36      0.907      0.667      0.774
0.565
            whiteboard          5          5      0.971          1      0.995
0.536
                 table          6          7      0.619      0.429      0.393
0.196
                    tv          1          2      0.926          1      0.995
0.652
Speed: 0.4ms preprocess, 10.5ms inference, 0.0ms loss, 2.5ms postprocess per image
Results saved to /content/runs/detect/val
{'mAP50-95': np.float64(0.5943079250671102), 'mAP50':
np.float64(0.8445052179463065), 'mAP75': np.float64(0.6452724627417927),
'per_class_mAP': array([    0.59431,     0.72618,     0.89145,       0.565,
0.53572,      0.1959,      0.6516]), 'speed_ms': {'preprocess': 0.4079971463453126,
'inference': 10.492500768289506, 'loss': 0.0003981219501062098, 'postprocess':
2.4746130853744526}}


book: AP50-95=0.594
books: AP50-95=0.726
monitor: AP50-95=0.891
office-chair: AP50-95=0.565
whiteboard: AP50-95=0.536
table: AP50-95=0.196
tv: AP50-95=0.652
```

Yolov8s – heavy augmentation - train

```
val: Fast image access ✅ (ping: 0.6±0.3 ms, read: 296.7±250.1 MB/s, size: 1996.2
KB)
val: Scanning /content/drive/MyDrive/Colab
Notebooks/combined_dataset/val/labels.cache... 82 images, 2 backgrounds, 0 corrupt:
100% ━━━━━━━━━━━━ 82/82 122.9Kit/s 0.0s
                 Class     Images  Instances      Box(P          R      mAP50
mAP50-95): 100% ━━━━━━━━━━━━ 3/3 0.5it/s 6.0s
                   all         82        253      0.858      0.791      0.869
0.597
                 books          9        153      0.959       0.92      0.967
0.64
               monitor         46         50      0.911        0.9      0.945
0.842
          office-chair         23         36      0.855      0.639      0.817
0.525
            whiteboard          5          5      0.984          1      0.995
0.587
```

```
                table          6          7      0.569      0.286      0.498
0.292
                   tv          1          2      0.871          1      0.995
0.697
Speed: 0.2ms preprocess, 10.0ms inference, 0.0ms loss, 4.0ms postprocess per image
Results saved to /content/runs/detect/val
{'mAP50-95': np.float64(0.597150691409977), 'mAP50':
np.float64(0.8693538993610099), 'mAP75': np.float64(0.6690936377989775),
'per_class_mAP': array([    0.59715,     0.63977,     0.84172,     0.52469,
0.58747,      0.2918,     0.69746]), 'speed_ms': {'preprocess':
0.20990359755670374, 'inference': 10.042173817071937, 'loss':
0.0007077317094648961, 'postprocess': 4.037841219514586}}


book: AP50-95=0.597
books: AP50-95=0.640
monitor: AP50-95=0.842
office-chair: AP50-95=0.525
whiteboard: AP50-95=0.587
table: AP50-95=0.292
tv: AP50-95=0.697
```

Yolo11n – train2

```
Ultralytics 8.3.199 🚀 Python-3.12.11 torch-2.8.0+cu126 CUDA:0 (Tesla T4, 15095MiB)
YOLO11n summary (fused): 100 layers, 2,583,517 parameters, 0 gradients, 6.3 GFLOPs
val: Fast image access ✅ (ping: 0.3±0.1 ms, read: 238.1±216.1 MB/s, size: 1996.2
KB)
val: Scanning /content/drive/MyDrive/Colab
Notebooks/combined_dataset/val/labels.cache... 82 images, 2 backgrounds, 0 corrupt:
100% ━━━━━━━━━━━━━━━━━━━━ 82/82 102.8Kit/s 0.0s
                 Class     Images  Instances      Box(P          R      mAP50
mAP50-95): 100% ━━━━━━━━━━━━━━━━━━━━ 3/3 0.5it/s 5.7s
                   all         82        253      0.869        0.8      0.869
0.591
                 books          9        153      0.992      0.813      0.964
0.695
               monitor         46         50      0.957      0.889      0.932
0.866
          office-chair         23         36      0.864      0.667      0.793
0.559
             whiteboard          5          5      0.776          1      0.928
0.514
                 table          6          7      0.675      0.429        0.6
0.363
                    tv          1          2      0.951          1      0.995
0.548
Speed: 3.9ms preprocess, 6.5ms inference, 0.0ms loss, 1.9ms postprocess per image
Results saved to /content/runs/detect/val2
{'mAP50-95': np.float64(0.5906702983796589), 'mAP50':
np.float64(0.8687523650864039), 'mAP75': np.float64(0.5741715201925097),
'per_class_mAP': array([    0.59067,     0.69502,     0.86559,     0.55877,
0.51412,      0.3626,     0.54793]), 'speed_ms': {'preprocess': 3.868378317070981,
'inference': 6.462925670714357, 'loss': 0.0005391707307397864, 'postprocess':
1.9331505731670626}}

book: AP50-95=0.591
books: AP50-95=0.695
monitor: AP50-95=0.866
office-chair: AP50-95=0.559
whiteboard: AP50-95=0.514
table: AP50-95=0.363
tv: AP50-95=0.548
```

Yolov8n – train3

```
Ultralytics 8.3.199 🚀 Python-3.12.11 torch-2.8.0+cu126 CUDA:0 (Tesla T4, 15095MiB)
Model summary (fused): 72 layers, 3,007,013 parameters, 0 gradients, 8.1 GFLOPs
val: Fast image access ✅ (ping: 0.4±0.2 ms, read: 114.6±95.1 MB/s, size: 1996.2
KB)
val: Scanning /content/drive/MyDrive/Colab
Notebooks/combined_dataset/val/labels.cache... 82 images, 2 backgrounds, 0 corrupt:
100% ━━━━━━━━━━━━ 82/82 162.8Kit/s 0.0s
                 Class     Images  Instances      Box(P          R      mAP50
mAP50-95): 100% ━━━━━━━━━━━━ 3/3 0.6it/s 4.7s
                   all         82        253      0.871      0.836      0.862
0.636
                 books          9        153      0.985      0.852      0.973
0.712
               monitor         46         50      0.929       0.88      0.934
0.866
          office-chair         23         36      0.866      0.715      0.774
0.519
            whiteboard          5          5      0.946          1      0.995
0.72
                 table          6          7      0.556      0.571      0.502
0.353
                    tv          1          2      0.943          1      0.995
0.648
Speed: 0.4ms preprocess, 4.6ms inference, 0.0ms loss, 2.2ms postprocess per image
Results saved to /content/runs/detect/val3
{'mAP50-95': np.float64(0.6362101342658398), 'mAP50':
np.float64(0.8623412351540852), 'mAP75': np.float64(0.7399145309415824),
'per_class_mAP': array([    0.63621,     0.71206,     0.86567,     0.51872,
0.71984,     0.35313,     0.64784]), 'speed_ms': {'preprocess': 0.3985970853669065,
'inference': 4.621975573183768, 'loss': 0.0004041219476564992, 'postprocess':
2.154720914637526}}

book: AP50-95=0.636
books: AP50-95=0.712
monitor: AP50-95=0.866
office-chair: AP50-95=0.519
whiteboard: AP50-95=0.720
table: AP50-95=0.353
tv: AP50-95=0.648
```

Yolov5nu – train4

```
Ultralytics 8.3.199 🚀 Python-3.12.11 torch-2.8.0+cu126 CUDA:0 (Tesla T4, 15095MiB)
YOLOv5n summary (fused): 84 layers, 2,504,309 parameters, 0 gradients, 7.1 GFLOPs
val: Fast image access ✅ (ping: 0.4±0.1 ms, read: 104.5±89.4 MB/s, size: 1996.2 KB)
val: Scanning /content/drive/MyDrive/Colab
Notebooks/combined_dataset/val/labels.cache... 82 images, 2 backgrounds, 0 corrupt:
100% ━━━━━━━━━━━━ 82/82 155.1Kit/s 0.0s
                 Class     Images  Instances      Box(P          R      mAP50  mAP50-
95): 100% ━━━━━━━━━━━━ 3/3 0.5it/s 6.1s
                   all         82        253      0.839      0.764      0.854
0.601
                 books          9        153       0.89      0.908      0.944
0.663
               monitor         46         50      0.937      0.892      0.928
0.848
          office-chair         23         36      0.772      0.639      0.747
0.545
            whiteboard          5          5      0.756          1      0.995
0.575
```

```
                table          6          7      0.678      0.286      0.515
0.281
                   tv          1          2          1      0.858      0.995
0.697
Speed: 0.3ms preprocess, 4.5ms inference, 0.0ms loss, 2.5ms postprocess per image
Results saved to /content/runs/detect/val4
{'mAP50-95': np.float64(0.6014659873419974), 'mAP50': np.float64(0.8538749666010362),
'mAP75': np.float64(0.6938772198109348), 'per_class_mAP': array([    0.60147,
0.66323,     0.84841,     0.54502,     0.57484,      0.2808,      0.6965]), 'speed_ms':
{'preprocess': 0.2843894878047073, 'inference': 4.465770878041661, 'loss':
0.000504219514834581, 'postprocess': 2.45230668293161}}


book: AP50-95=0.601
books: AP50-95=0.663
monitor: AP50-95=0.848
office-chair: AP50-95=0.545
whiteboard: AP50-95=0.575
table: AP50-95=0.281
tv: AP50-95=0.697
```

Yolov5su

```
Ultralytics 8.3.199 🚀 Python-3.12.11 torch-2.8.0+cu126 CUDA:0 (Tesla T4, 15095MiB)
YOLOv5s summary (fused): 84 layers, 9,114,245 parameters, 0 gradients, 23.8 GFLOPs
val: Fast image access ✅ (ping: 0.3±0.1 ms, read: 389.7±342.4 MB/s, size: 1996.2 KB)
val: Scanning /content/drive/MyDrive/Colab
Notebooks/combined_dataset/val/labels.cache... 82 images, 2 backgrounds, 0 corrupt:
100% ━━━━━━━━━━━━━━━━━━━━ 82/82 126.2Kit/s 0.0s
                 Class     Images  Instances      Box(P          R      mAP50  mAP50-
95): 100% ━━━━━━━━━━━━━━━━━━━━ 3/3 0.5it/s 6.2s
                   all         82        253      0.826      0.823      0.857
0.612
                 books          9        153      0.993      0.912      0.974
0.732
               monitor         46         50      0.918      0.893      0.937
0.895
          office-chair         23         36      0.809      0.707      0.791
0.537
            whiteboard          5          5      0.823          1      0.995
0.505
                 table          6          7      0.517      0.429      0.453
0.254
                    tv          1          2      0.895          1      0.995
0.748
Speed: 3.5ms preprocess, 8.9ms inference, 0.0ms loss, 1.9ms postprocess per image
Saving /content/runs/detect/val/predictions.json...
Results saved to /content/runs/detect/val
{'mAP50-95': np.float64(0.6117038921214883), 'mAP50': np.float64(0.8573696452223936),
'mAP75': np.float64(0.668004007313841), 'per_class_mAP': array([     0.6117,
0.73167,     0.89489,     0.53681,     0.50512,     0.25362,     0.74813]), 'speed_ms':
{'preprocess': 3.5127960975609223, 'inference': 8.92631363414483, 'loss':
0.000636085363156581, 'postprocess': 1.8564270365836486}}

book: AP50-95=0.612
books: AP50-95=0.732
monitor: AP50-95=0.895
office-chair: AP50-95=0.537
whiteboard: AP50-95=0.505
table: AP50-95=0.254
tv: AP50-95=0.748
```

Model Comparison

Rank	Model	mAP50–95	mAP50	Inference (ms)	Notable per-class highlights
1	**YOLOv8n (train3)**	**0.636**	0.862	**4.6**	Whiteboard 0.720 (best), Book 0.636, Monitor 0.866
2	**YOLOv5su**	0.612	0.857	8.9	**Monitor 0.895 (best), TV 0.748 (best), Books 0.732 (best)**
3	YOLOv5n (train4)	0.601	0.854	4.5	TV 0.697, Monitor 0.848, Books 0.663
4	YOLOv8s (aug)	0.597	0.869	10.0	TV 0.697, Monitor 0.842, Books 0.640
5	YOLOv8s	0.594	0.845	10.5	Monitor 0.891, Books 0.726, TV 0.652
6	YOLO11n (train2)	0.591	0.869	6.5	Table 0.363 (best among non-v8n), Monitor 0.866

Overall, yolov8n has the best performance.

Both training and validation losses (box, cls, dfl) consistently decrease across epochs showcasing good convergence, and no divergence.

Validation losses are a bit higher and noisier than training losses which is expected since dataset is relatively small.