

Topic 2 - Face Detection

Group 57

Jun 27, 2024

YOLOv10-L Model Performance

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+ Code + Text

Class      Images  Instances  Box(P   R      mAP50  mAP50-95): 100% 342
all        5460    46458     0.862   0.668   0.735   0.419

Epoch      GPU_mem  box_om  cls_om  dfl_om  box_oo  cls_oo  dfl_oo  Instances  Size
49/50       12.7G    1.176   0.5165  1.108   1.419   0.6591  1.071     9          640: 100% 3284/3284 [
Class      Images  Instances  Box(P   R      mAP50  mAP50-95): 100% 342/342 [01:42<00:00, 3.35it/s]
all        5460    46458     0.861   0.668   0.735   0.419

Epoch      GPU_mem  box_om  cls_om  dfl_om  box_oo  cls_oo  dfl_oo  Instances  Size
50/50       14.7G    1.175   0.5122  1.101   1.417   0.6588  1.065     1          640: 100% 3284/3284 [
Class      Images  Instances  Box(P   R      mAP50  mAP50-95): 100% 342/342 [01:42<00:00, 3.35it/s]
all        5460    46458     0.859   0.669   0.735   0.42

50 epochs completed in 13.777 hours.
Optimizer stripped from /content/drive/MyDrive/face-detection-project/runs/detect/train4/weights/train46/weights/last.pt, 52.2MB
Optimizer stripped from /content/drive/MyDrive/face-detection-project/runs/detect/train4/weights/train46/weights/best.pt, 52.2MB

Validating /content/drive/MyDrive/face-detection-project/runs/detect/train4/weights/train46/weights/best.pt...
Ultralytics YOLOv8.1.34 Python-3.10.12 torch-2.3.0+cu121 CUDA:0 (NVIDIA L4, 22700MiB)
YOLOv10l summary (fused): 461 layers, 25717910 parameters, 0 gradients, 126.3 GFLOPs
Class      Images  Instances  Box(P   R      mAP50  mAP50-95): 0% 0/342 [00:00<?, ?it/s]/usr/local/
return F.conv2d(input, weight, bias, self.stride,
Class      Images  Instances  Box(P   R      mAP50  mAP50-95): 100% 342/342 [02:58<00:00, 1.91it/s]
all        5460    46458     0.486   0.64    0.393   0.233

Speed: 0.2ms preprocess, 28.1ms inference, 0.0ms loss, 0.1ms postprocess per image
Results saved to /content/drive/MyDrive/face-detection-project/runs/detect/train4/weights/train46
💡 Learn more at https://docs.ultralytics.com/modes/train
```

Figure 1: Train model

YOLOv10-L Model Performance

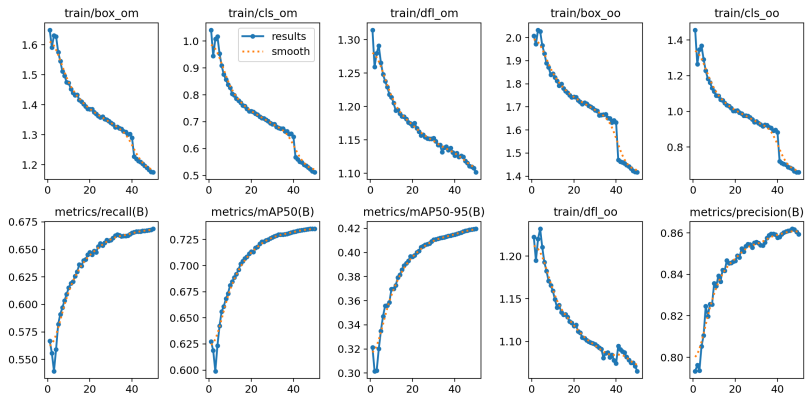


Figure 2: Train model result

Comparison with Other Models

- **Accuracy and Speed:**

- Our model showed competitive precision and recall rates compared to other leading models.
- The average precision (mAP@0.5) was 73.5%, while the mAP@0.5:0.95 reached 41.9%.
- The inference speed was efficient, making our model suitable for real-time applications.

- **Resource Utilization:**

- The model demonstrated efficient GPU memory usage, with a peak of 17.2G during training.
- The combination of precision, speed, and resource efficiency highlights the robustness of our model for face detection tasks.

