[ Tip and Tricks list]

*Here is an exhaustive, that you could use to boost your model performance*

Data Labeling

• Use representative data for each class

• Avoid adding low-quality data

• Small dataset size for pre-trained models

• Bigger dataset size when training from scratch

• Identify and fix incorrect classes

• Balance your data distribution

• Use Soft-Labeling: Labeling using pre-trained models (free labeled data)

• Use Self-Training: Labeling using the model you are training (free labeled data)

• Add hard examples: images your model is struggling to detect target objects

Image Size

• Use the highest image resolution your GPU can afford.

• Use progressive resizing: Train with small-size images, and gradually increase the size

• Use tiling: Train using image patches

• Use the image size recommended by the model

Anchor-Boxes

• Use anchor boxes with a size/ratio close to target boxes

• Use auto-anchoring: search for the best anchors

• Use some anchor-free object detection models

Data Augmentation (DA)

• Oversample images with small boxes

• Use transforms close to your use case

• Use Copy & Paste / Mosaic DA

• Use Mosaic DA

• Use heavy DA at the beginning of training

• Use light DA at the end of the training

• Use synthetic data

Modeling

• Use larger models: they outperform smaller ones

• Use smaller models when training small dataset

• Use Focal Loss for the classification head

• Use GIoU Loss for the regression head (box location)

Training

• Train from scratch if data is different than the COCO dataset

• Freeze the whole/part of the backbone

• Use suggested LR

• Increase LR when using multiple GPU

• Use the discriminative learning rate technique

• Decrease batch size if the loss plateaus

• Decrease LR if the loss plateaus

• Train as long as your validation loss is decreasing

• Add more data, and data augmentation when overfitting

Inference

• Put the model on evaluation mode

• Use the same image size as in the training phase

• With high-resolution images, apply inference on patches/slices like in the SAHI library

