

MMRotate 1.x

全新架构，创造全新可能



什么是



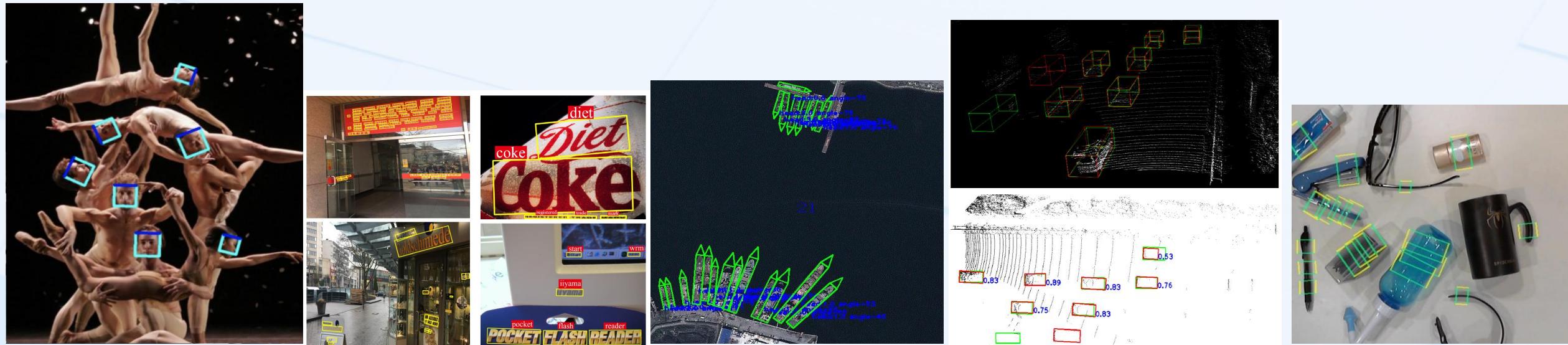
MMRotate ?

Zhou Y , Yang X , Zhang G , et al. MMRotate: A Rotated Object Detection Benchmark using Pytorch.
Proceedings of the 30th ACM International Conference on Multimedia, pp. 7331–7334, 2022.

斜框检测任务介绍

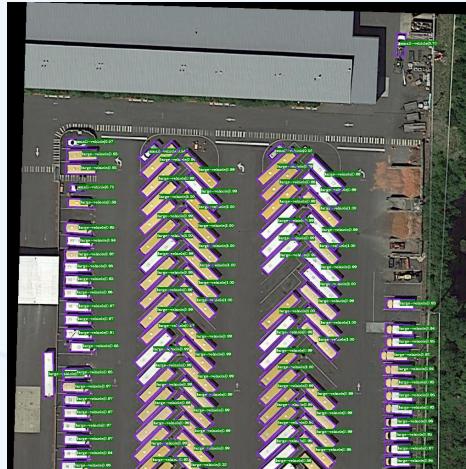
得益于通用检测的蓬勃发展，目前绝大多数的斜框检测模型都是基于经典的通用检测器。通过重新定义目标表示形式以及增加回归自由度数量的操作来实现对旋转矩形框、四边形甚至任意形状目标的检测（文中统称斜框检测）。如何更加高效地进行高精度的斜框检测已成为当下的研究热点，下面列举一些斜框检测已经被应用或者有巨大潜力的领域：

人脸识别、场景文字、遥感影像、自动驾驶、医学图像、机器人抓取

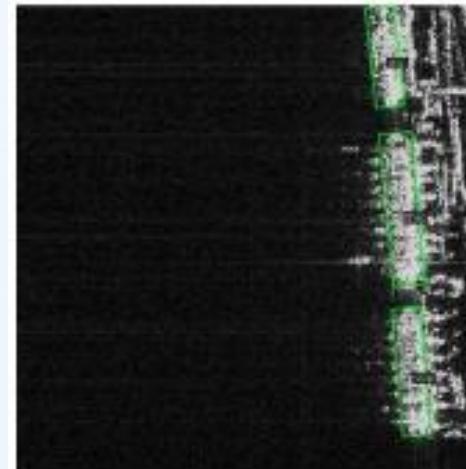


MMRotate

基于 PyTorch 和 MMDetection 的开源斜框检测工具箱



光学遥感



SAR图像



自 2022.2.18 发布 v0.1.0 至今

18 Models

6 Datasets

1.1k Stars

28 Contributors

131 Commits

333 Closed Issues

3 Github Trending (总榜)

5 Github Trending (Python榜)



AI Fast Track
@ai_fast_track

>You probably never heard of MMRotate

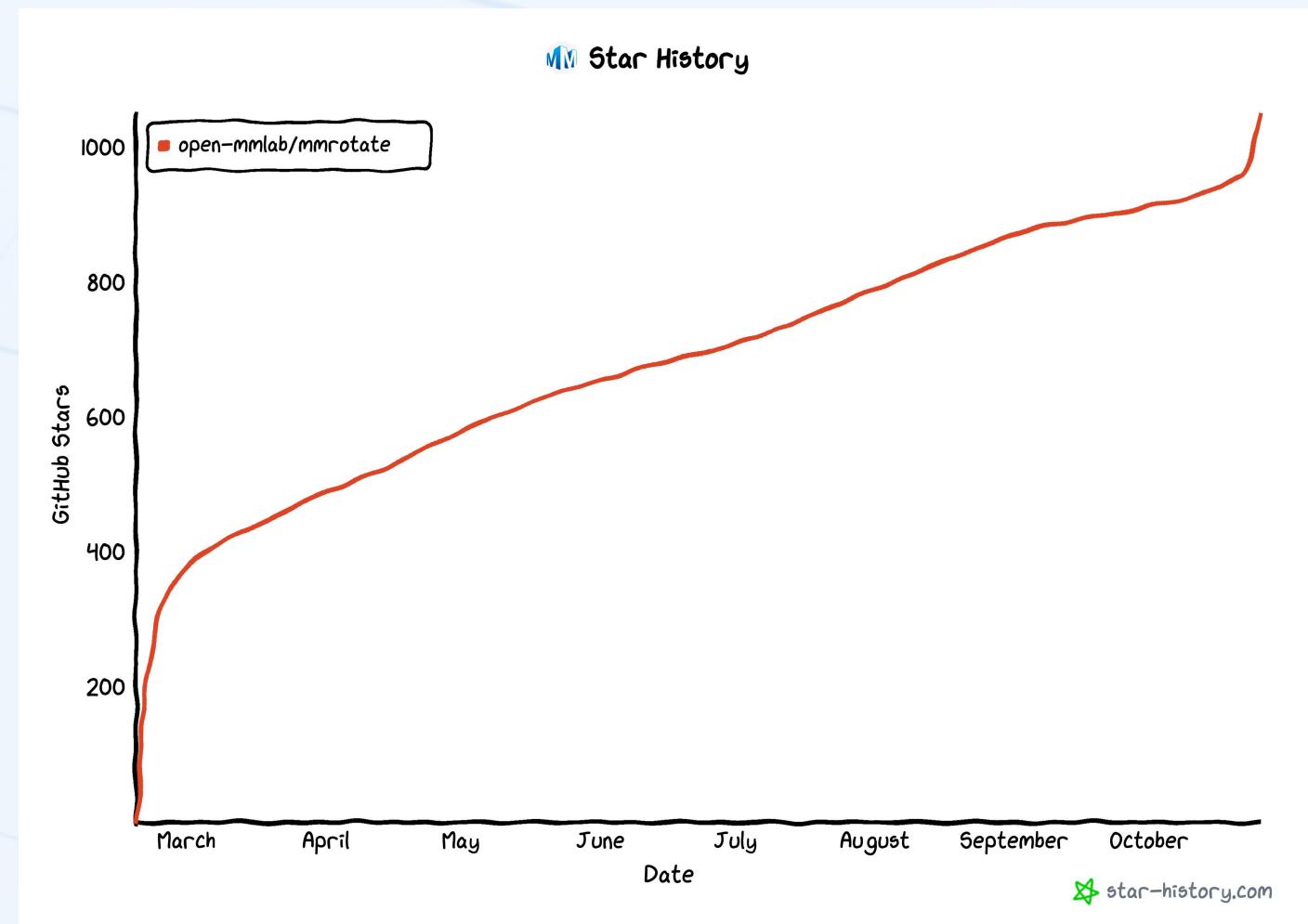
Here are some reasons why you should be familiar with:

- MMRotate is an open-source toolbox for rotated object detection based on PyTorch
- Like the awesome MMDetection library, It is part of the [@OpenMMLab](#) project (18 libraries 😱)



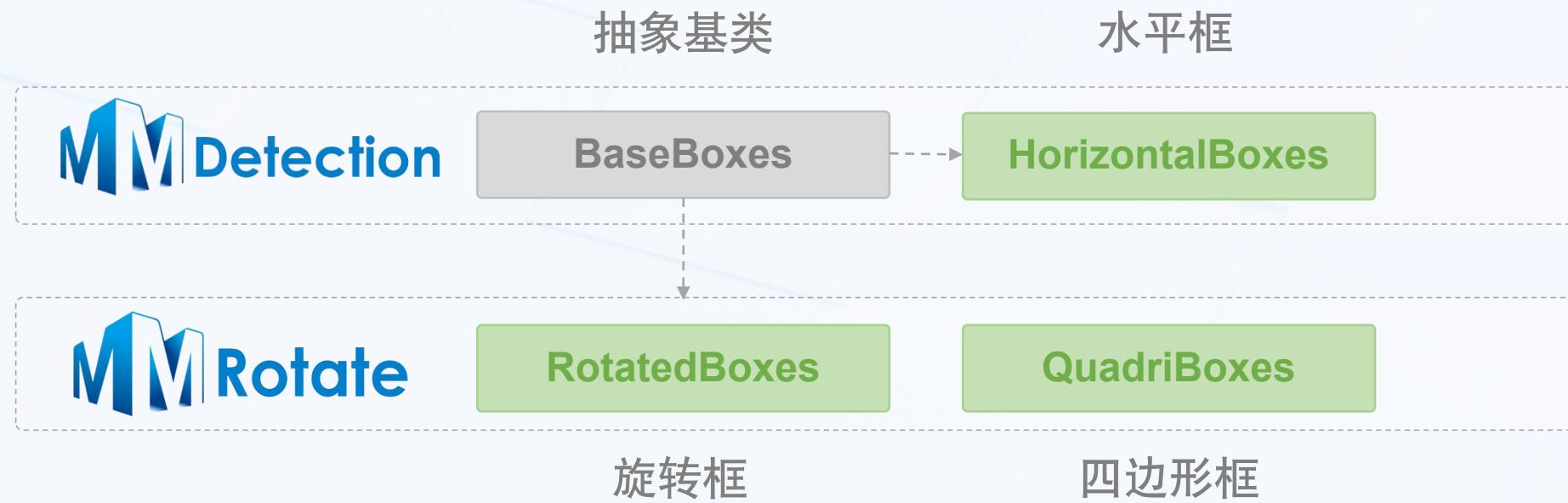
0:14 | 5.4万次观看

上午12:10 · 2022年10月22日 · FeedHive.io



3 Github Trending (总榜)

5 Github Trending (Python榜)



- ✓ centers
- ✓ clip_
- ✓ is_inside

- ✓ areas
- ✓ rotate_
- ✓ find_inside_points

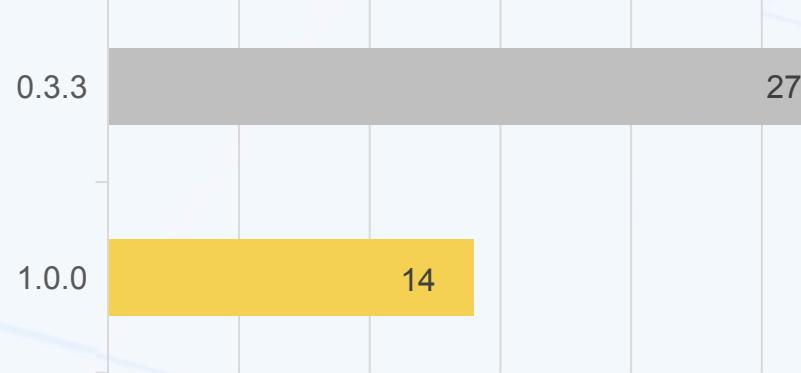
- ✓ flip_
- ✓ project_
- ✓ overlaps

- ✓ translate_
- ✓ rescale_
- ✓ from_instance_masks

统一的 API

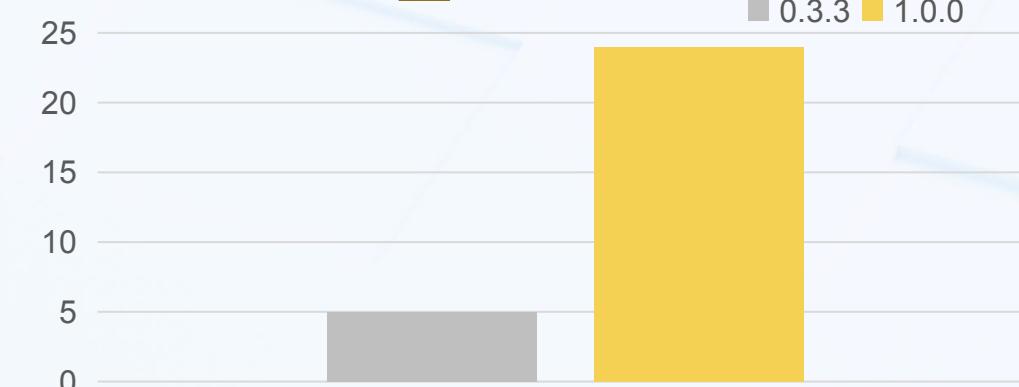


</> head 数量比较



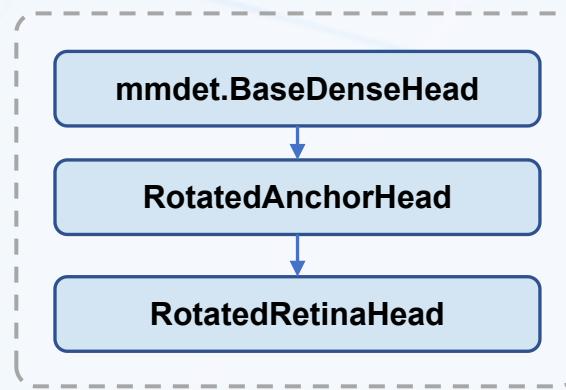
经重构和精简
head 数量已减少 **48%**

数据变换数量

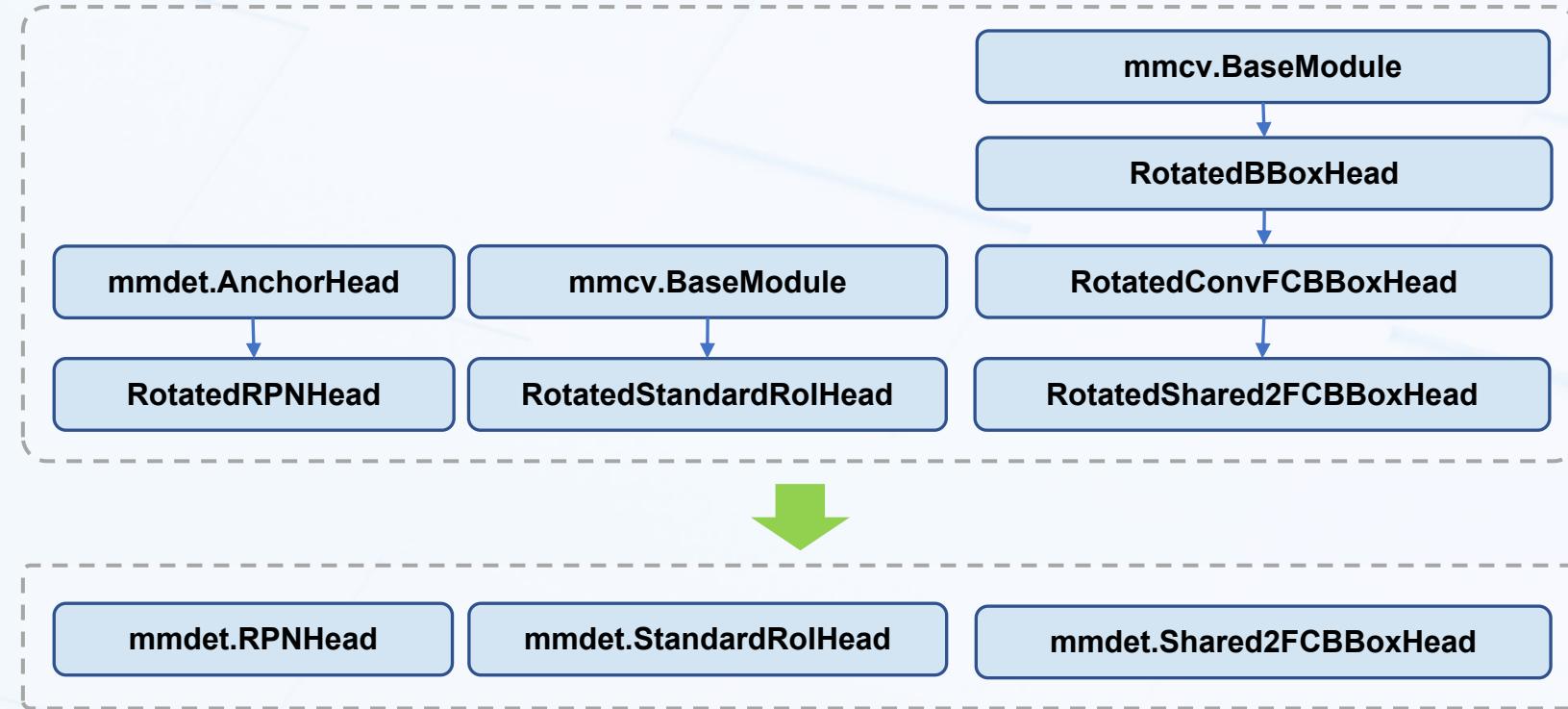


支持的旋转框
数据增强增加 **5倍**

head 重构前后对比



Rotated RetinaNet



Rotated Faster R-CNN

head 拿来直接用，省去大量继承



RandomFlip

RandomShift

RandomCrop

CopyPaste

ShearX

ShearY

TranslateX

TranslateY

RandomAffine

Pad

Expand

MinIoU
RandomCrop

Albu

RandomAffine

Random
CenterCropPad

Mosaic

MixUp

CachedMosaic

CachedMixUp



ConvertBoxType

ConvertMask2BoxType

Rotate

RandomRotate

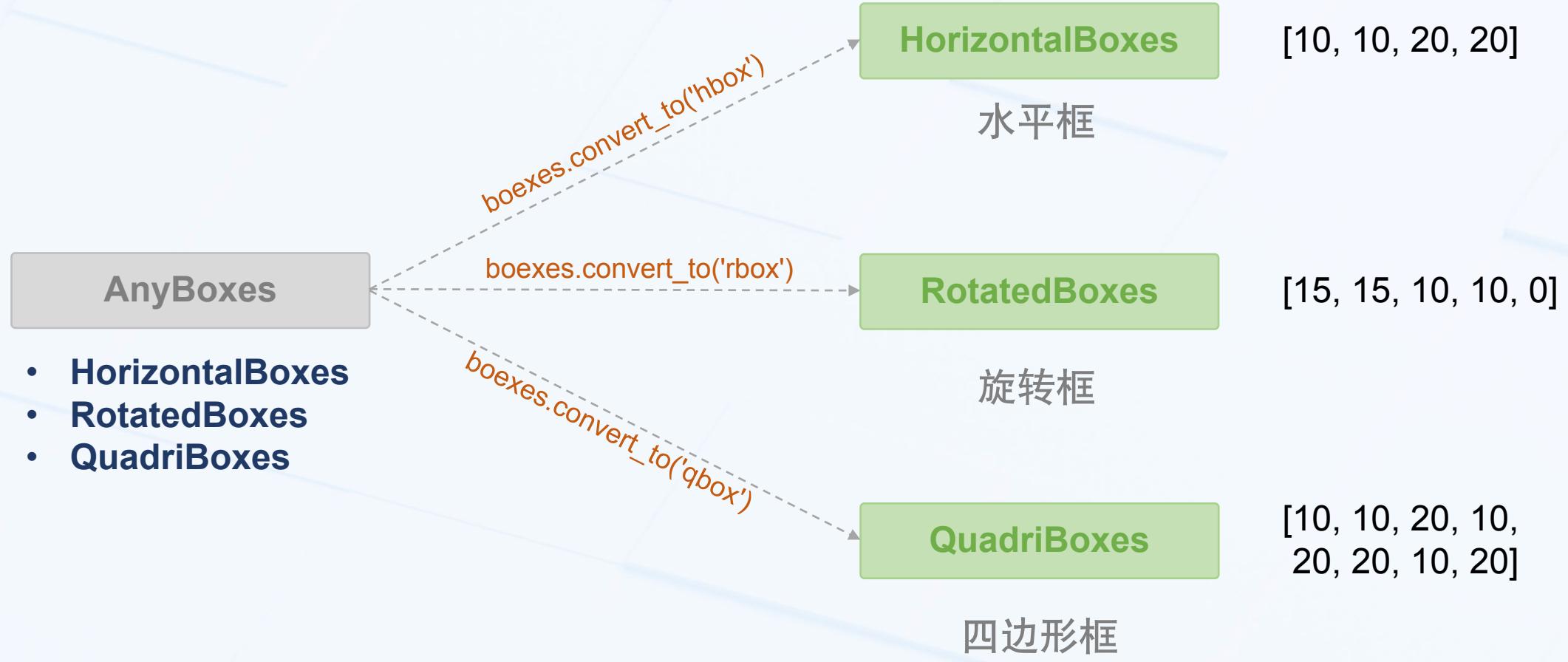
RandomChoiceRotate

海量旋转框数据增强任你选

2.0

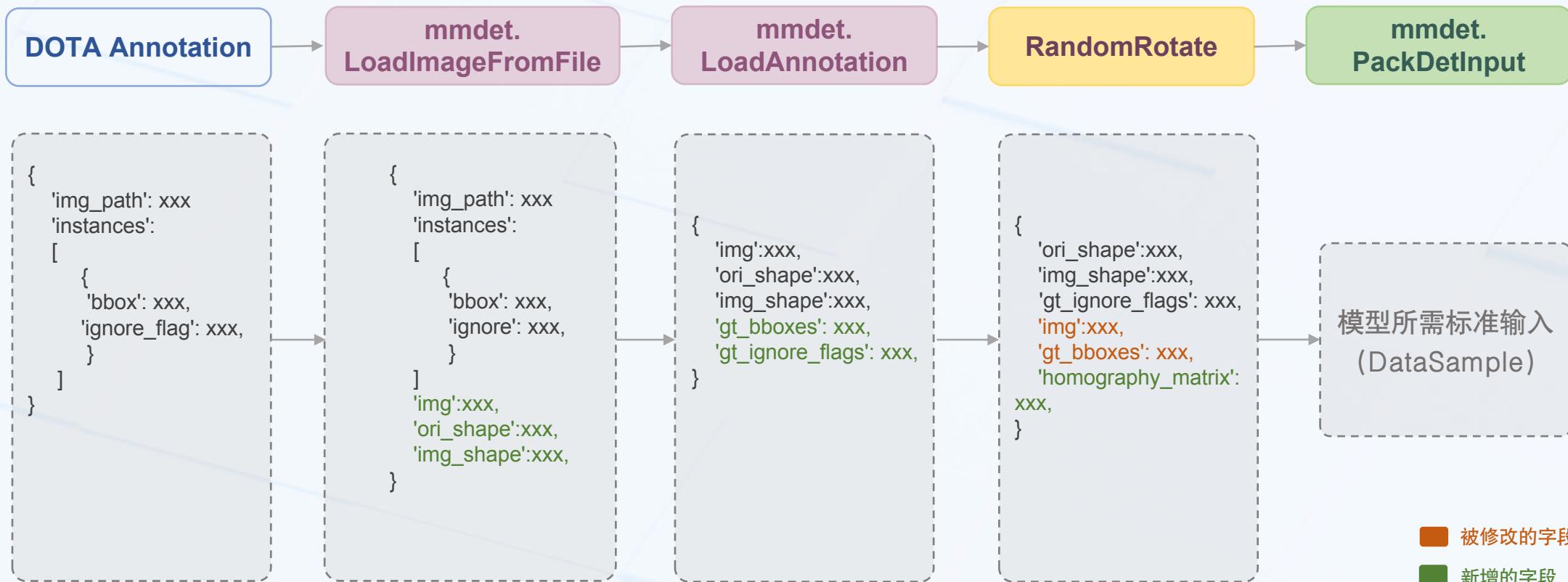
✓ <code>__len__</code>	✓ <code>__deepcopy__</code>	✓ <code>__repr__</code>	✓ <code>new_tensor</code>
✓ <code>new_full</code>	✓ <code>new_empty</code>	✓ <code>new_ones</code>	✓ <code>new_zeros</code>
✓ <code>size</code>	✓ <code>dim</code>	✓ <code>device</code>	✓ <code>dtype</code>
✓ <code>shape</code>	✓ <code>numel</code>	✓ <code>numpy</code>	✓ <code>to</code>
✓ <code>cpu</code>	✓ <code>cuda</code>	✓ <code>clone</code>	✓ <code>detach</code>
✓ <code>view</code>	✓ <code>reshape</code>	✓ <code>expand</code>	✓ <code>repeat</code>
✓ <code>transpose</code>	✓ <code>permute</code>	✓ <code>split</code>	✓ <code>chunk</code>
✓ <code>unbind</code>	✓ <code>flatten</code>	✓ <code>squeeze</code>	✓ <code>unsqueeze</code>
✓ <code>cat</code>	✓ <code>stack</code>	✓ <code>__getitem__</code>	✓ <code>__setitem__</code>

降低学习成本: Torch.Tensor 有的, BaseBoxes 必须有!



统一的转换函数

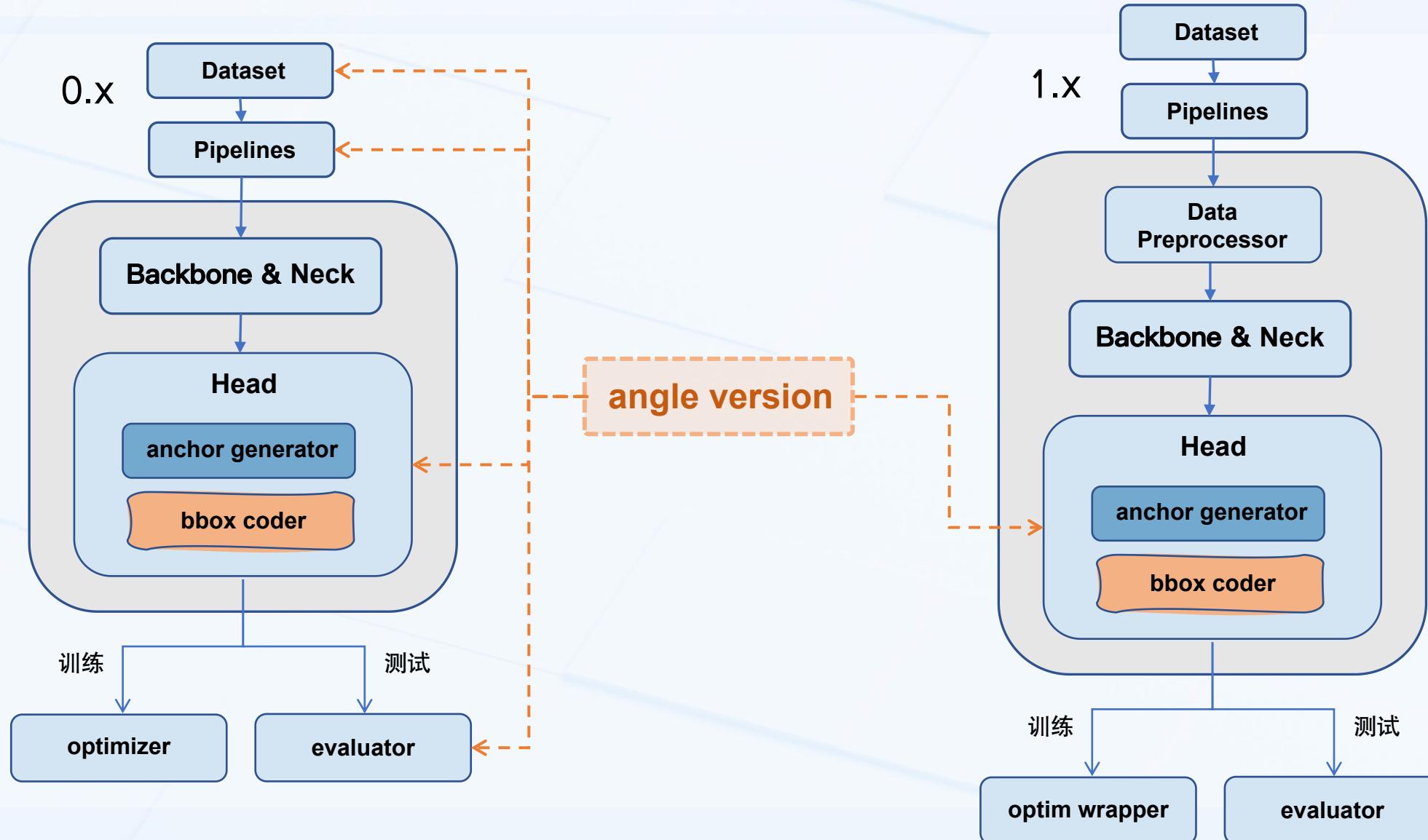
四边形检测任务



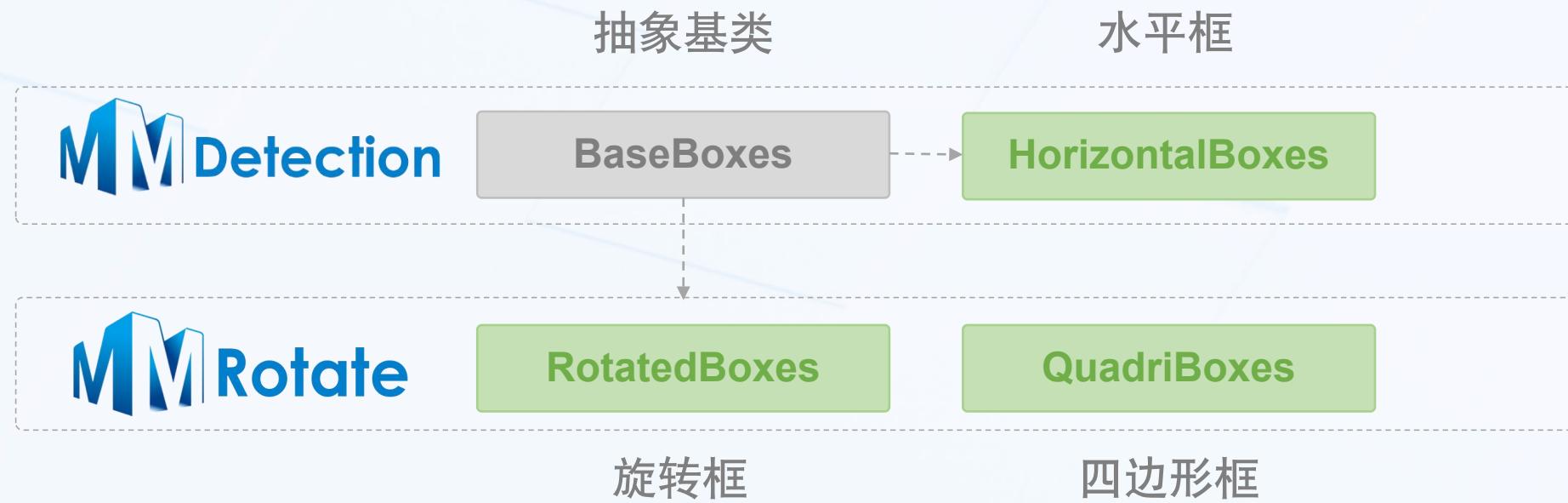
```
dict(type='mmdet.LoadAnnotations', with_bbox=True, box_type='qbox') # QuadriBoxes
```

只需修改配置文件即可轻松加载四边形标注

角度表示法



缩小角度表示法作用域



四边形框检测任务

Quadrilateral Boxes Object Detection

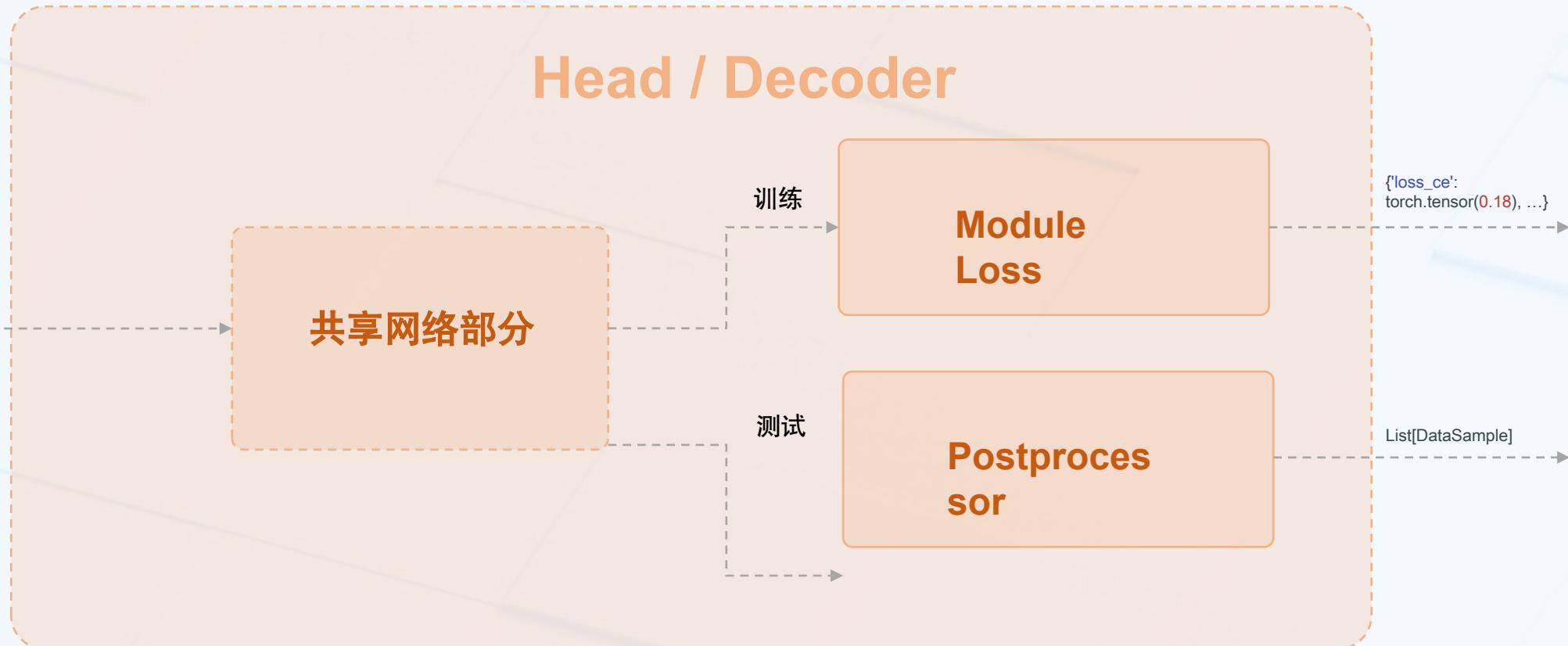
加载四边形框标注

训练

四边形框 IoU 算子
`mmcv.ops.box_iou_quadri`

推理

四边形框 NMS 算子
`mmcv.ops.nms_quadri`





易用

上手更友好，文档更全面。



统一

遵循 OpenMMLab
2.0 与 MMRotate
1.0 规范。



强大

便捷的跨库调用与焕然
一新的各个组件，由新
版本呈现。

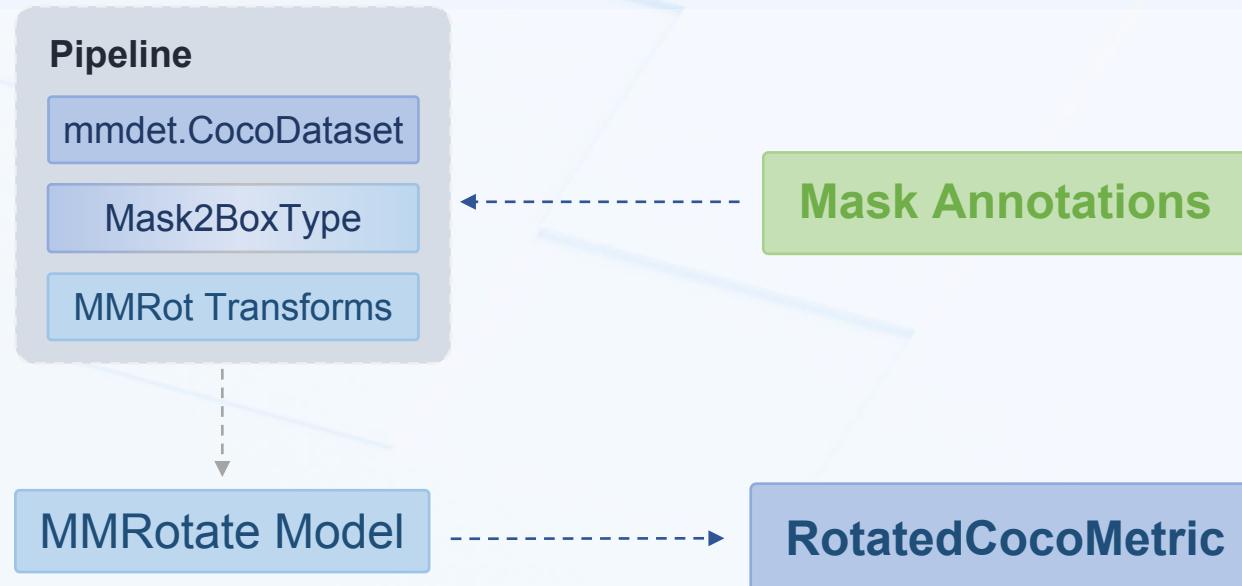
2.0

数据集

- DOTA
- HRSC2016
- SSDD
- HRSID
- RSDD
- SRSDD
- COCO style

评测指标

- DOTA Metric (rbox/qbox)
- Rotated COCO Metric



Average Precision (AP) @[IoU=0.50:0.95 | area= all | maxDets=100] = 0.635
Average Precision (AP) @[IoU=0.50 | area= all | maxDets=1000] = 0.948
Average Precision (AP) @[IoU=0.75 | area= all | maxDets=1000] = 0.757
Average Precision (AP) @[IoU=0.50:0.95 | area= small | maxDets=1000] = 0.202
Average Precision (AP) @[IoU=0.50:0.95 | area=medium | maxDets=1000] = 0.516
Average Precision (AP) @[IoU=0.50:0.95 | area= large | maxDets=1000] = 0.665
Average Recall (AR) @[IoU=0.50:0.95 | area= all | maxDets=100] = 0.705
Average Recall (AR) @[IoU=0.50:0.95 | area= all | maxDets=300] = 0.705
Average Recall (AR) @[IoU=0.50:0.95 | area= all | maxDets=1000] = 0.705
Average Recall (AR) @[IoU=0.50:0.95 | area= small | maxDets=1000] = 0.400
Average Recall (AR) @[IoU=0.50:0.95 | area=medium | maxDets=1000] = 0.624
Average Recall (AR) @[IoU=0.50:0.95 | area= large | maxDets=1000] = 0.731

MMDeploy

				30+ Computer Vision Libraries

MMCV Neural Network Operators Data Transforms **MMEngine** Training Engine Evaluation Engine Module Management

PyTorch

OpenMMLab 2.0

由新一代训练基座强力驱动



MM Rotate

$$18 + N = ?$$

MMRotate 可联动多个算法库

2.0

MMRotate x MMCls

```
# please install mmcls>=1.0.0rc0
# import mmcls.models to trigger register_module in mmcls
custom_imports = dict(imports=['mmcls.models'], allow_failed_imports=False)
checkpoint_file = 'https://download.openmmlab.com/mmclassification/v0/convnext-tiny-2d-in1k/best-convnext-tiny-2d-in1k_20220714.pth'

model = dict(
    backbone=dict(
        _delete_=True,
        type='mmcls.ConvNeXt',
        arch='tiny',
        out_indices=[0, 1, 2, 3],
        drop_path_rate=0.4,
        layer_scale_init_value=1.0,
        gap_before_final_norm=False,
        init_cfg=dict(
            type='Pretrained', checkpoint=checkpoint_file,
            prefix='backbone.')),
    neck=dict(in_channels=[96, 192, 384, 768])))

lr_config = dict(warmup_iters=1000)
find_unused_parameters = True
```

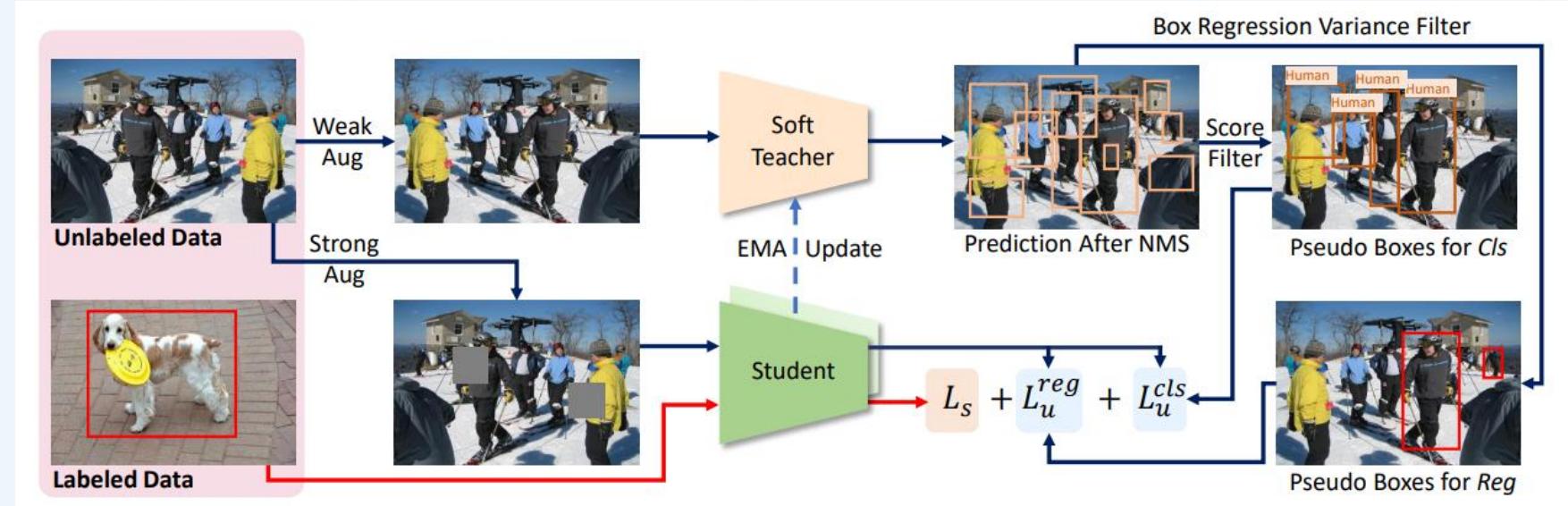


- SE-ResNet
- SE-ResNeXt
- RegNet
- ShuffleNetV1
- ShuffleNetV2
- MobileNetV2
- MobileNetV3
- Swin-Transformer
- RepVGG
- Vision-Transformer
- Transformer-in-Transformer
- Res2Net
- MLP-Mixer
- DeiT
- Conformer
- T2T-ViT
- Twins
- EfficientNet
- ConvNeXt
- HRNet
- VAN
- ConvMixer
- CSPNet
- PoolFormer
- MViT
- EfficientFormer
- HorNet

MMRotate x MMDetection

BoxType 抽象

- HorizontalBoxes
- RotatedBoxes
- Quadrilaterals



Soft Teacher

半监督目标检测框架

MMRotate x MMDetection

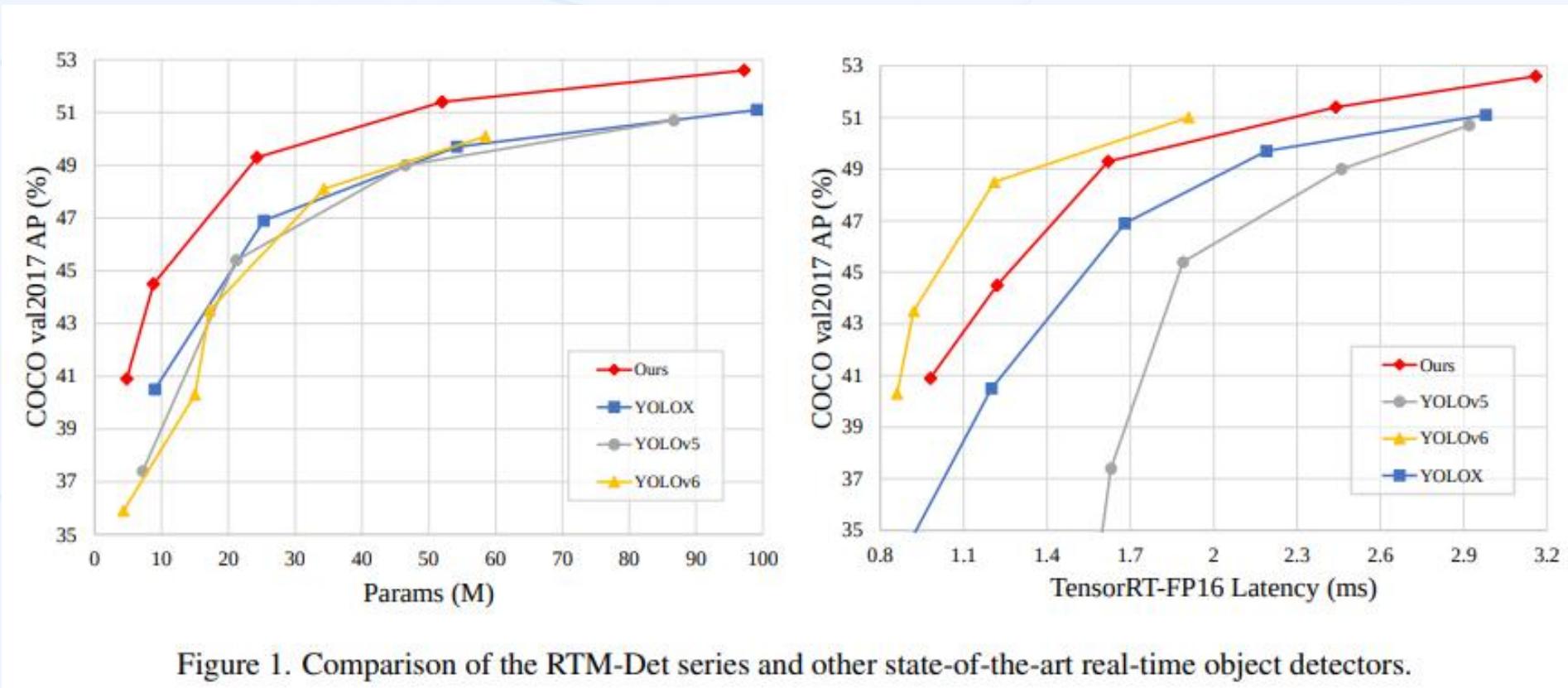
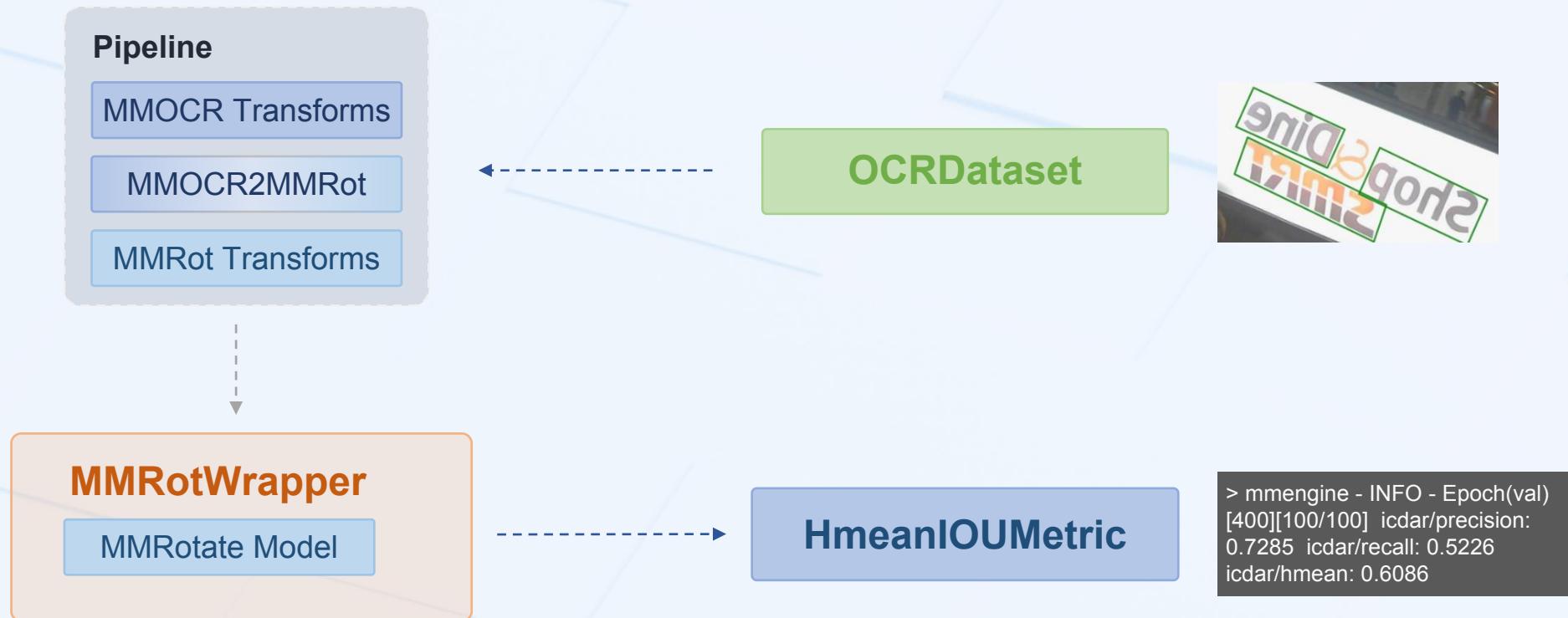


Figure 1. Comparison of the RTM-Det series and other state-of-the-art real-time object detectors.

MMRotate x MMOCR



MMDeploy

Model	Task	ONNX Runtime	TensorRT	NCNN	PPLNN	OpenVINO	Model config
RotatedRetinaNet	RotatedDetection	Y	Y	N	N	N	config
Oriented RCNN	RotatedDetection	Y	Y	N	N	N	config
Gliding Vertex	RotatedDetection	N	Y	N	N	N	config
RoI Transformer	RotatedDetection	Y	Y	N	N	N	config

一站式部署

MMDeploy 已支持 4 模型 2 后端

SASM (AAAI`2022)
Oriented Reppoints (CVPR`2022)
...

服务社区

提高创新效率，扩大影响力

OpenMMLab 2.0

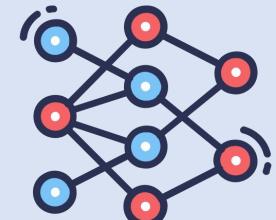
新架构、新任务、新生态



GitHub Star 1.1K+



GitHub Fork 200+



算法: 18+



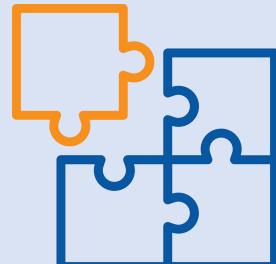
权重文件: 40+



基于新架构



联动多个算法库



可扩展
易配置



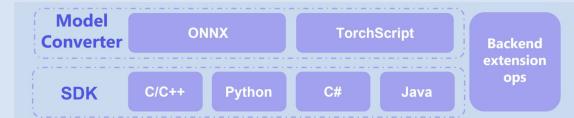
方便的研究工具

Rotated Object
Detection

RTMDet-Rot

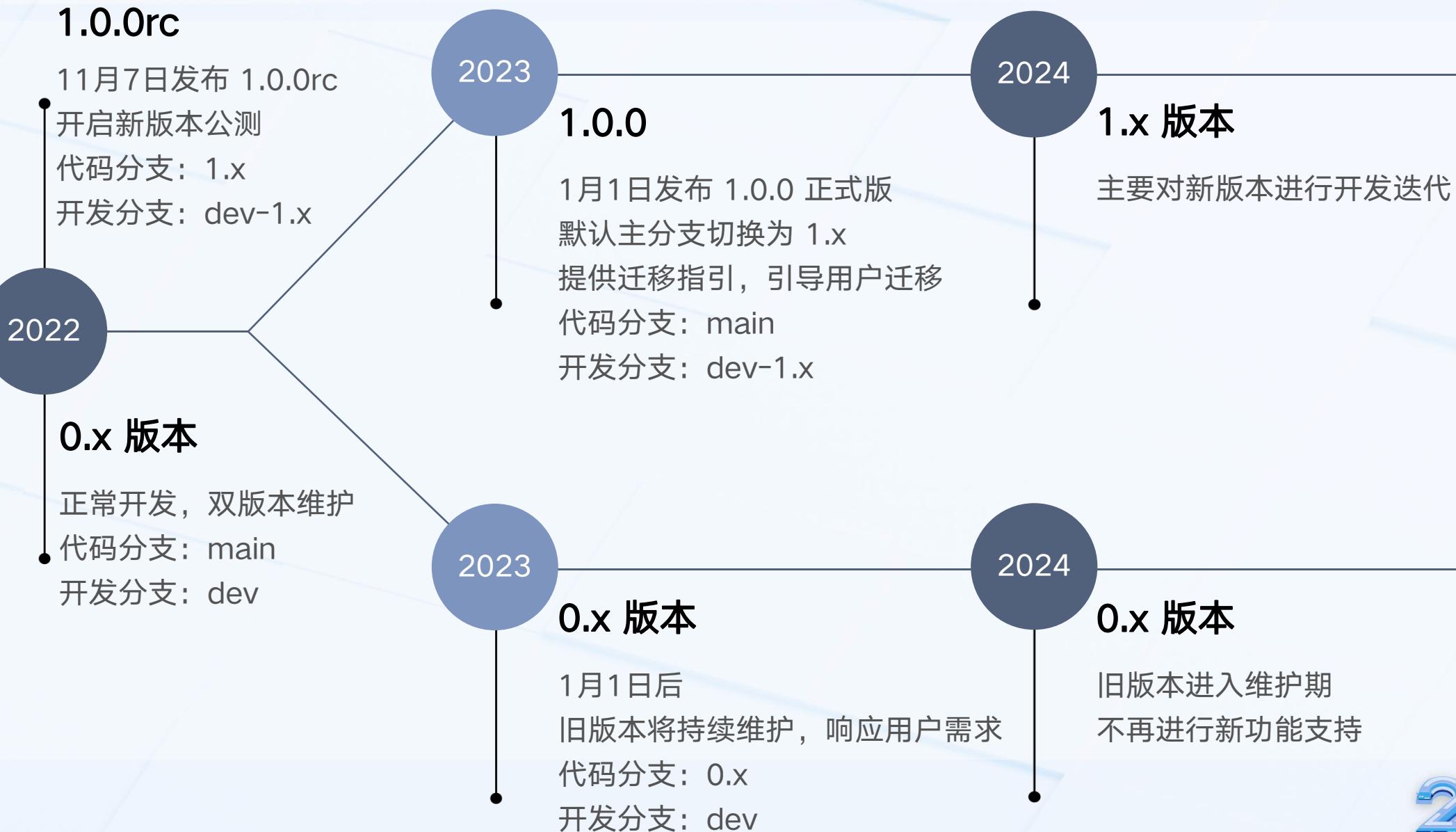
Text Detection

Semi-Supervised
Object Detection



便捷的模型推理部署

后续计划



Thanks!

<https://github.com/open-mmlab/mmrotate>

