Many current rotation detectors use plenty of anchors with different orientations to achieve spatial alignment with ground truth boxes. Intersection-over-Union (IoU) is then applied to sample the positive and negative candidates for training. However, we observe that the selected positive anchors cannot always ensure accurate detections after regression, while some negative samples can achieve accurate localization. It indicates that the quality assessment of anchors through IoU is not appropriate, and this further leads to inconsistency between classification confidence and the input IoU. However, only 74% of the positive anchors can localize GT well after regression (with output IoU higher than 0.5), which illustrates that many false positive samples are introduced.

Surprisingly, there are up to 58% of the high-quality detections (output IoU higher than 0.5) come from unmatched anchors, which implies that quite a lot of negative anchors (58% in this example) have the potential to achieve accurate localization.

The proposed dynamic anchor learning strategy make the label assignment more reasonable. The matching degree is constructed to comprehensively considers the spatial alignment, feature alignment ability, and regression uncertainty for label assignment. Then dynamic anchor selection and matching-sensitive loss are integrated into the training pipeline to improves the high-precision detection performance and alleviate the gap between classification and regression tasks.

The source code of the proposed Dynamic Anchor Learning methods as a plug-in of an evaluation framework is available at: https://github.com/ming71/DAL