Supplementary material

Additional results on PASCAL VOC

We show more qualitative results of instance segmentation predicted by cascade detection-to-segmentation learning, the proposed PDSL without ACL and full PDSL, respectively, on the PASCAL VOC 2012 *val*. As shown in Fig. S1, simple parallel detection-and-segmentation learning framework ("PDSL w/o ACL") provides slightly worse performance than traditional cascade detection-to-segmentation learning ("Cascade"). And instance-activation correlation module is vital to achieving high performance for parallel detection-and-segmentation learning ("PDSL"), which benefits both detection and segmentation tasks. The instance-activation correlation module also alleviates the ambiguity of detectors when input images have multiple instances with the same category, as shown in Fig. S2.

We further provide qualitative analysis on the PASCAL VOC 2012 *val* from the task perspective and categorize failure cases into detection error and segmentation error. As shown in Fig. S3, the former error fails to localize objects while the latter often struggles to predict fine masks around object boundaries.

Additional results on MS COCO

Fig. S4 and Fig. S5 show some success and failure cases on MS COCO. Our failure modes are categorized into three types: (1) confusion with similar objects (the top row of Fig. S5), (2) localization error (the middle row of Fig. S5), and (3) failing to distinguish multiple instances (the bottom row of Fig. S5).
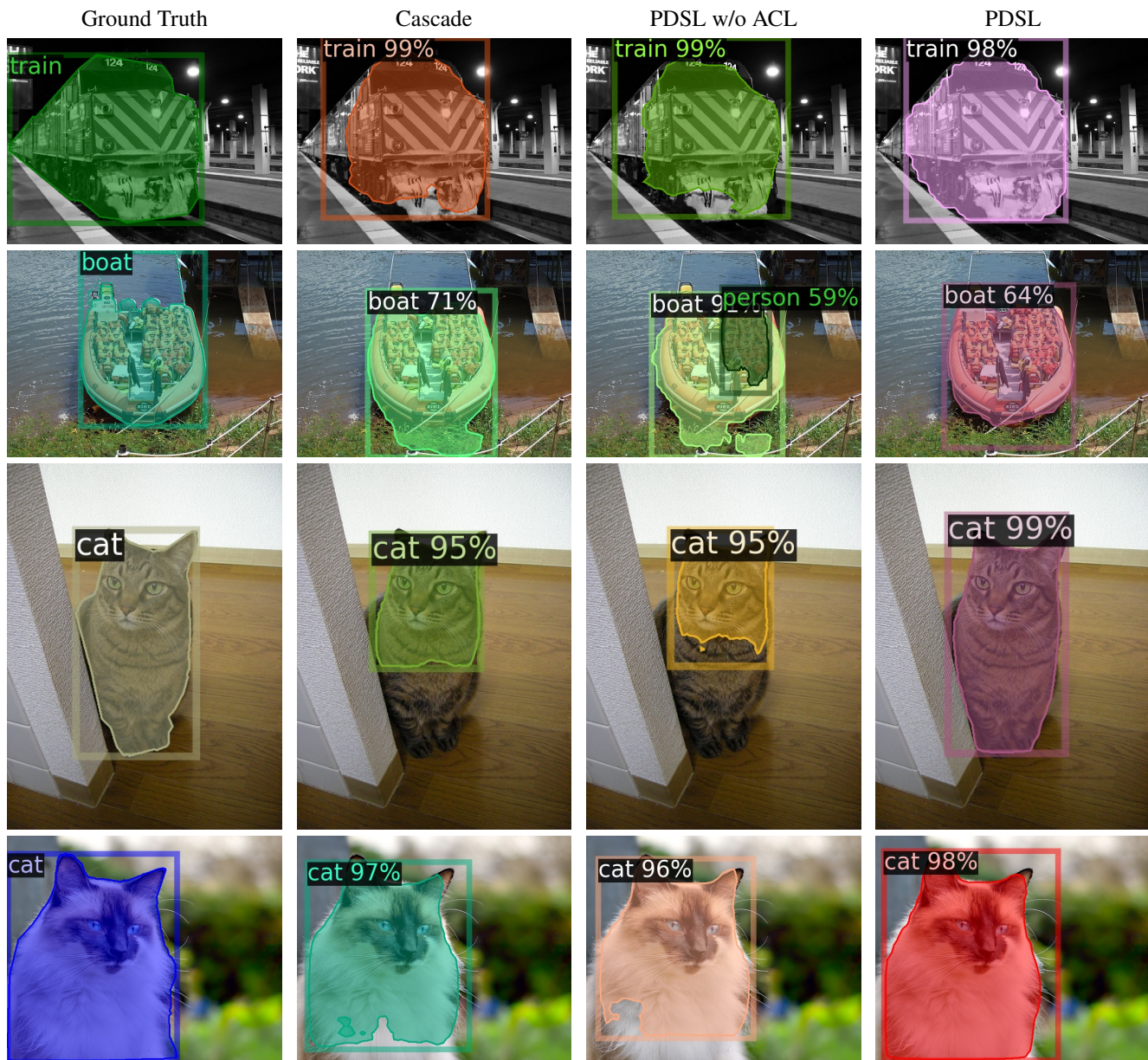
Figure S1: Qualitative results from cascade learning, PDSL without ACL and full PDSL on the PASCAL VOC 2012 *val*.
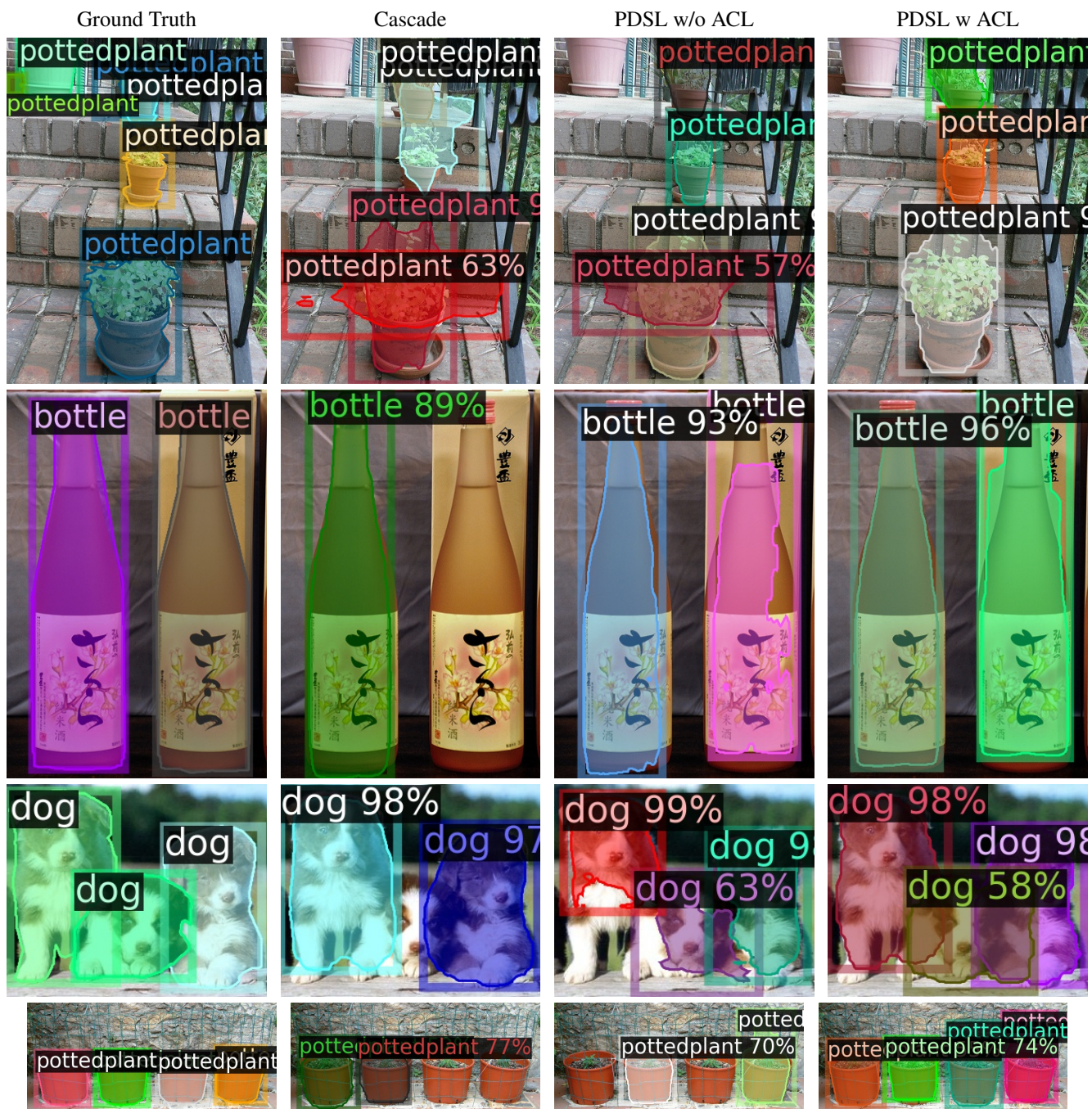
Figure S2: More results from cascade learning, PDSL without ACL and full PDSL on the PASCAL VOC 2012 *val*.

(a) Detection Error.

(b) Segmentation Error.

Figure S3: Failure cases on the PASCAL VOC 2012 *val*. Left: Pred, Right: GT.
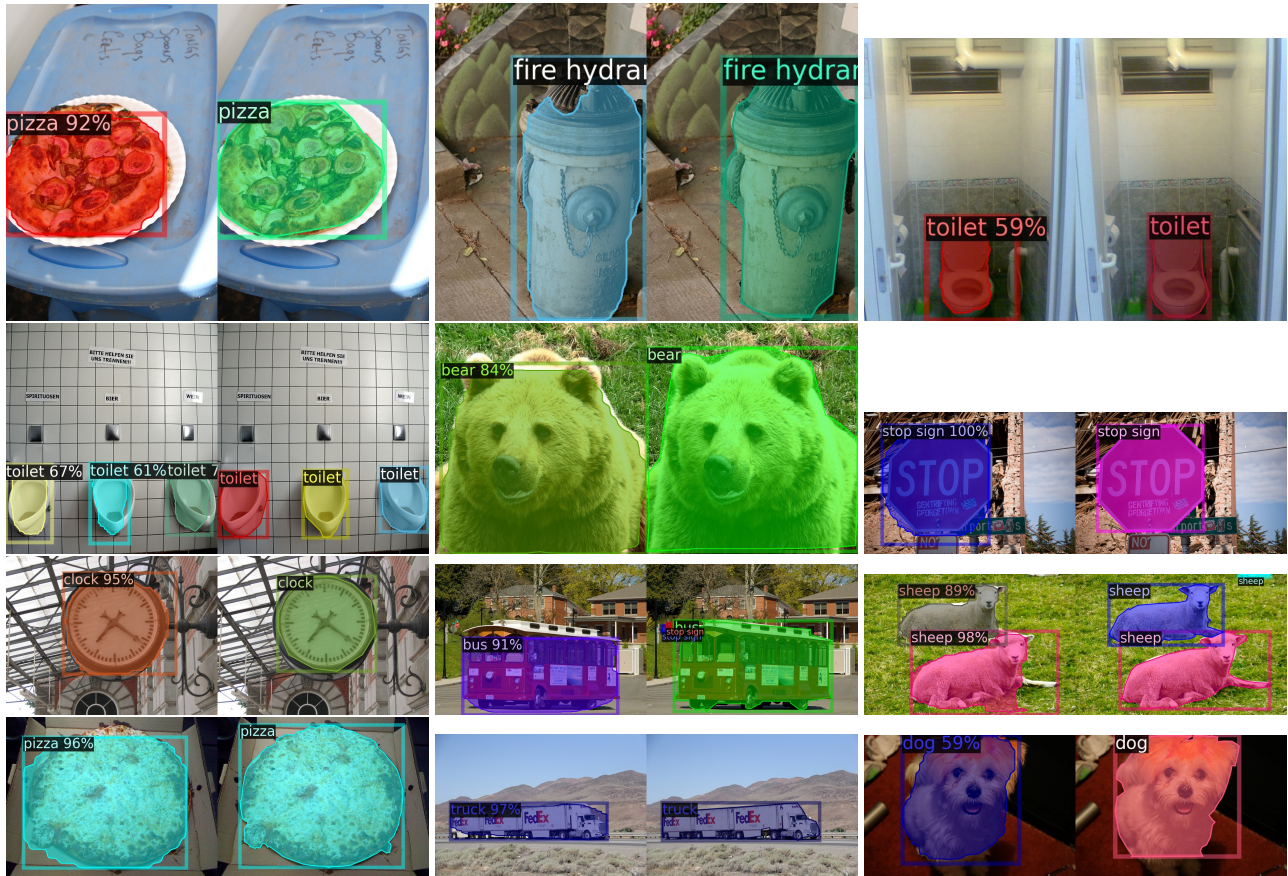
Figure S4: Qualitative results of instance segmentation on the MS COCO *val*. PDSL outputs and ground-truth segmentation are presented from left to right in each group.
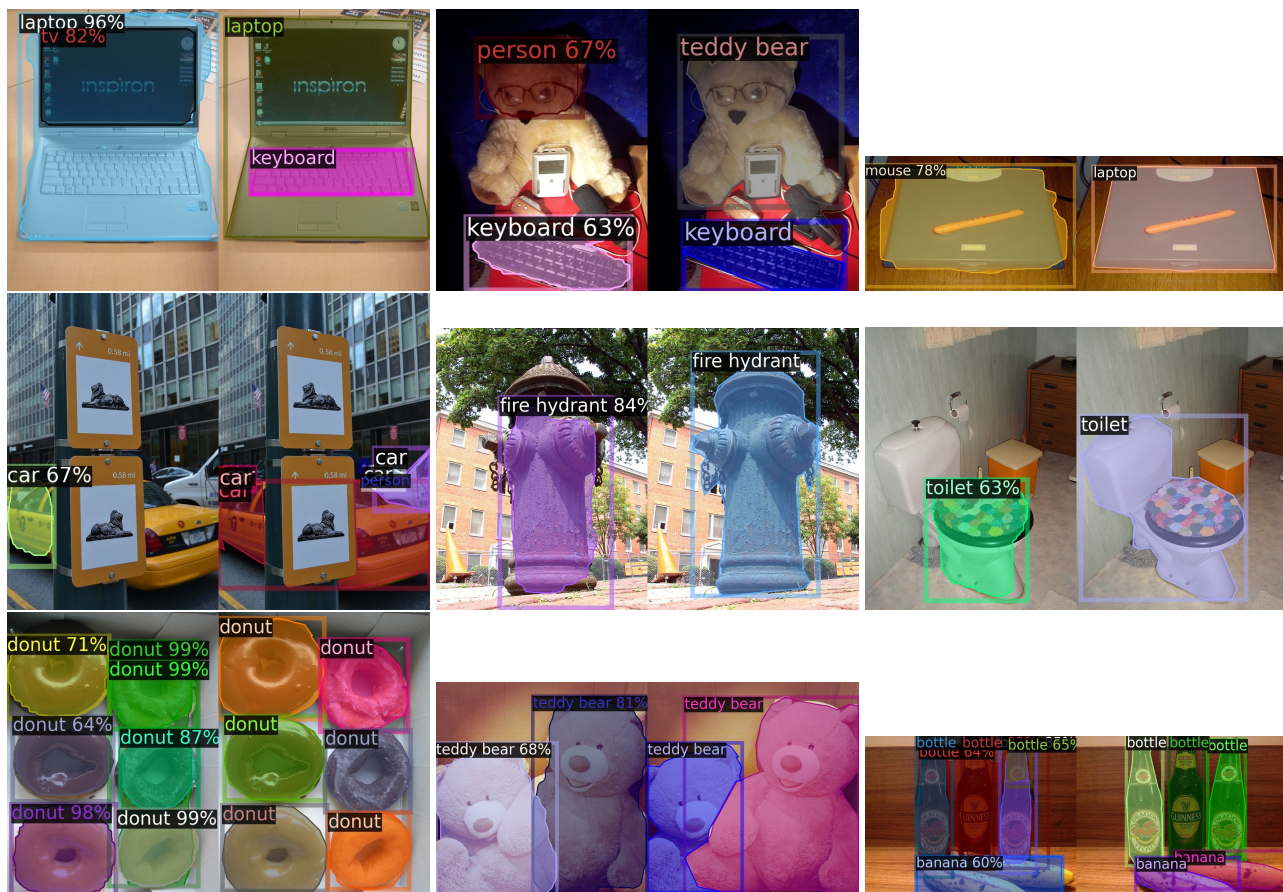
Figure S5: Failure cases of instance segmentation on the MS COCO *val*. PDSL outputs and ground-truth segmentation are presented from left to right in each group.