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Abstract:

Edge-preserving smoothing filters have been shown to improve generalization performance on the HOG features with a SVM classifier. However, not all smoothing filters and parameters lead to better performance. The effects of smoothing filters are studied on the Faster R-CNN detector using generic object and human detection datasets, namely the PASCAL VOC and KITTI respectively. The total variation (TV) smoothing filter was used for this study. It was found that the TV smoothing removed details the CNN was using for detection which degraded performance for both datasets. The results are consistent with previous observations that CNNs tend to learn weak visual features. The performance loss, however, was moderate and could be justified in the context of improving robustness to perturbations. The PASCAL VOC and KITTI datasets had comparable performance loss despite the latter having many more small objects that tend to blend into the background when smoothing is applied.