

Weekly Report

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Abstract—This week I mainly put my effort on keeping finding materials of SAR image contest and reading a new paper about pooling, which is accepted by CVPR 2018 as oral paper.

I. PAPER READING

IN this paper, they aim to leverage recent results on image downscaling for the purposes of deep learning. Inspired by the human visual system, which focuses on local spatial changes, they propose **detail preserving pooling (DPP)**, an adaptive pooling method that magnifies spatial changes and preserves important structural detail. Importantly, its parameters can be learned jointly with the rest of the network. They analyze some of its theoretical properties and show its empirical benefits on several datasets and networks, where DPP consistently outperforms previous pooling approaches. Overall, the contributions are as follows:

- They presented a novel pooling layer for convolutional neural networks termed detail-preserving pooling (DPP), based on the idea of inverse bilateral filters.
- DPP allows downscaling to focus on important structural detail; learnable parameters control the amount of detail preservation.
- DPP can be combined with stochastic pooling methods with further accuracy gains as detail preservation and regularization complement each other.

The author showed theoretically that DPP can adapt to perform similar to max/extremum or average pooling, or on a nonlinear continuum of intermediate functions while incurring only a minor computational overhead. I think it might be useful for my semantic segmentation work. Fig. 1 is the Diagram of detail-preserving downscaling (DPID) and detail-preserving pooling (DPP). Fig. 2 is the downscaling visual comparison with other methods.

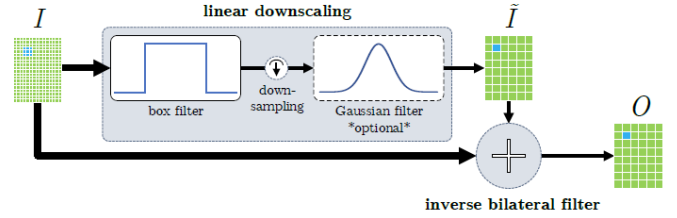


Fig. 1: Diagram of DPP and DPID

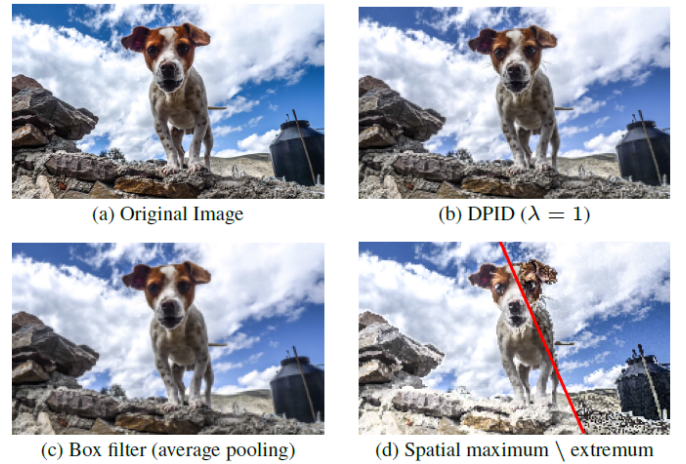


Fig. 2: Downscaling visual comparison