

Multi-granularity Semantic Alignment Distillation Learning for Remote Sensing Image Semantic Segmentation

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Method and Ideas

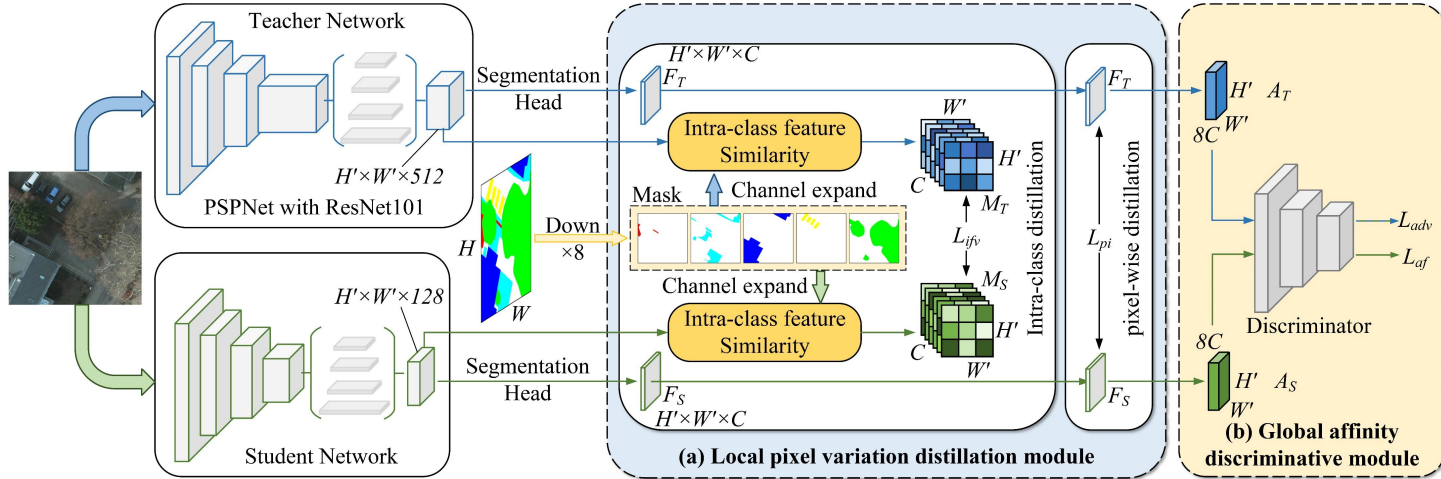


Fig. Overview of the proposed approach. The blue arrows are used for the teacher network, and the green arrows are used for the student network.

- ❑ In this paper, to better ensure the consistency of teacher network and student network in the training process and improve the accuracy of feature category segmentation, we propose a new multi-granularity semantic alignment knowledge distillation method.
- ❑ Because semantic segmentation is a structural prediction problem, more structural knowledge is conducive to the segmentation model for better feature extraction.
- ❑ We transfer the pixel category probability distribution, intra-class feature difference, and inter-pixel dependency of the teacher segmentation model from three dimensions to the lightweight student segmentation model.

Main Contributions and Results

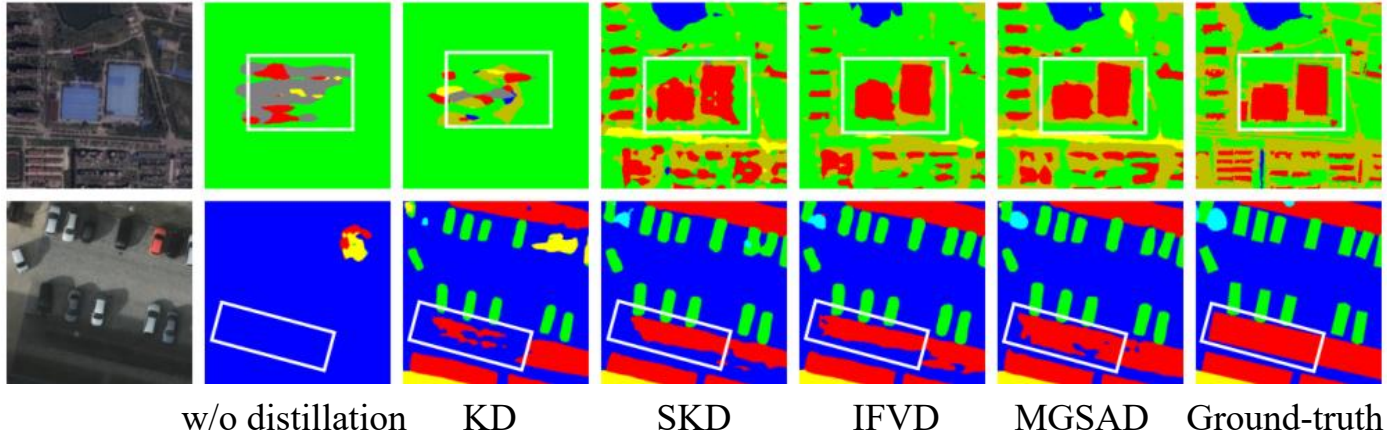


Fig. The visualization of results predicted by our proposed approach and comparison methods.

Contributions:

- We design a local pixel variation distillation module for mining pixel-category distribution consistency by utilizing pixel-wise and intra-class variation distillation strategies.
- We propose a global affinity discriminative module to learn structural information. It takes full account of higher-order affinity dependencies and incorporates the idea of adversarial learning to distill.

Table 2 Performance comparisons of proposed method and other methods.

Data Set	WHDDL		ISPRS Potsdam	
	MIoU(%)	PA(%)	MIoU(%)	PA(%)
T:Resnet101	69.83	89.06	82.16	89.06
S:Resnet18	56.59	79.42	72.80	80.67
KD [3]	56.90	79.66	73.26	81.05
SKD [4]	58.84	81.52	74.35	81.85
IFVD [5]	59.38	81.67	74.92	82.32
MGSAD	60.61	82.39	75.84	83.23
S:Resnet50	58.95	81.02	77.50	87.46
KD [3]	59.11	81.14	77.93	87.84
SKD [4]	59.71	82.07	78.86	88.76
IFVD [5]	60.92	82.96	79.47	88.93
MGSAD	61.23	83.17	80.21	89.2