

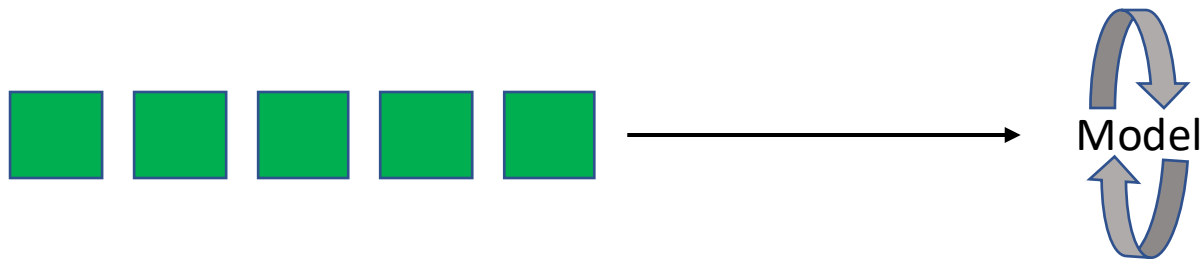
Semantic Segmentation with Active Semi-Supervised Learning

Aneesh Rangnekar¹, Christopher Kanan², Matthew Hoffman¹

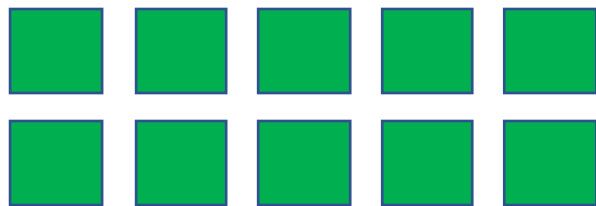
¹Rochester Institute of Technology

²University of Rochester

Terminology Overview

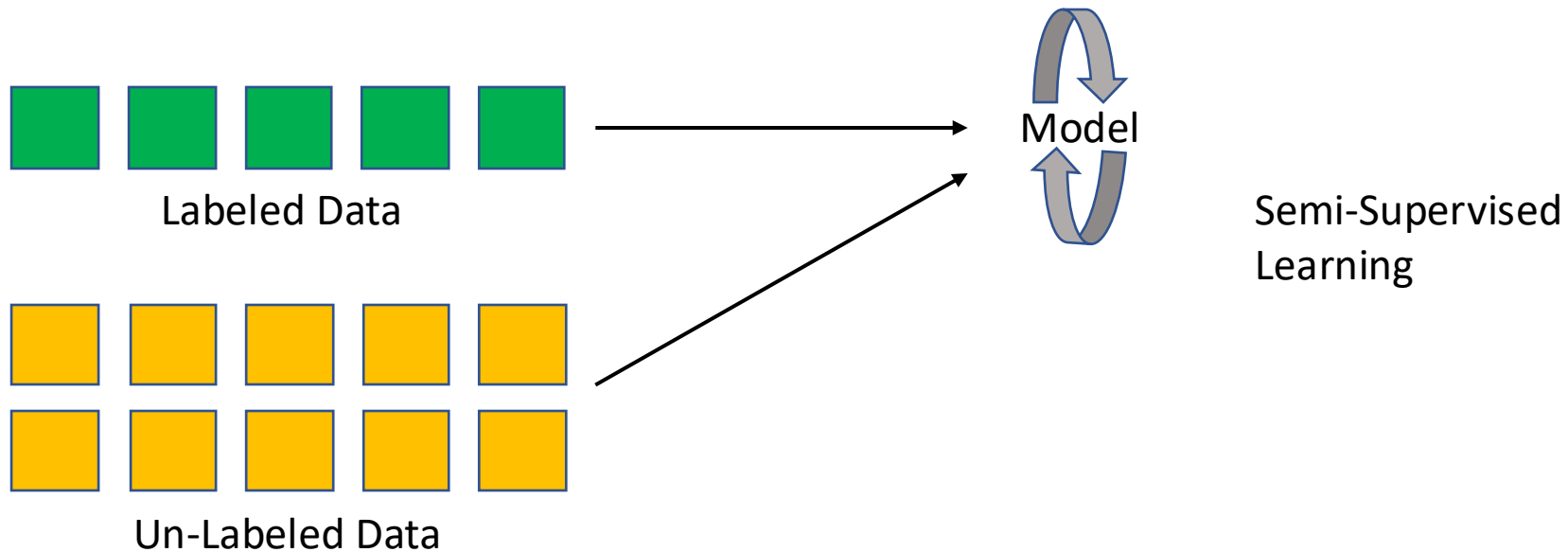


Supervised Learning

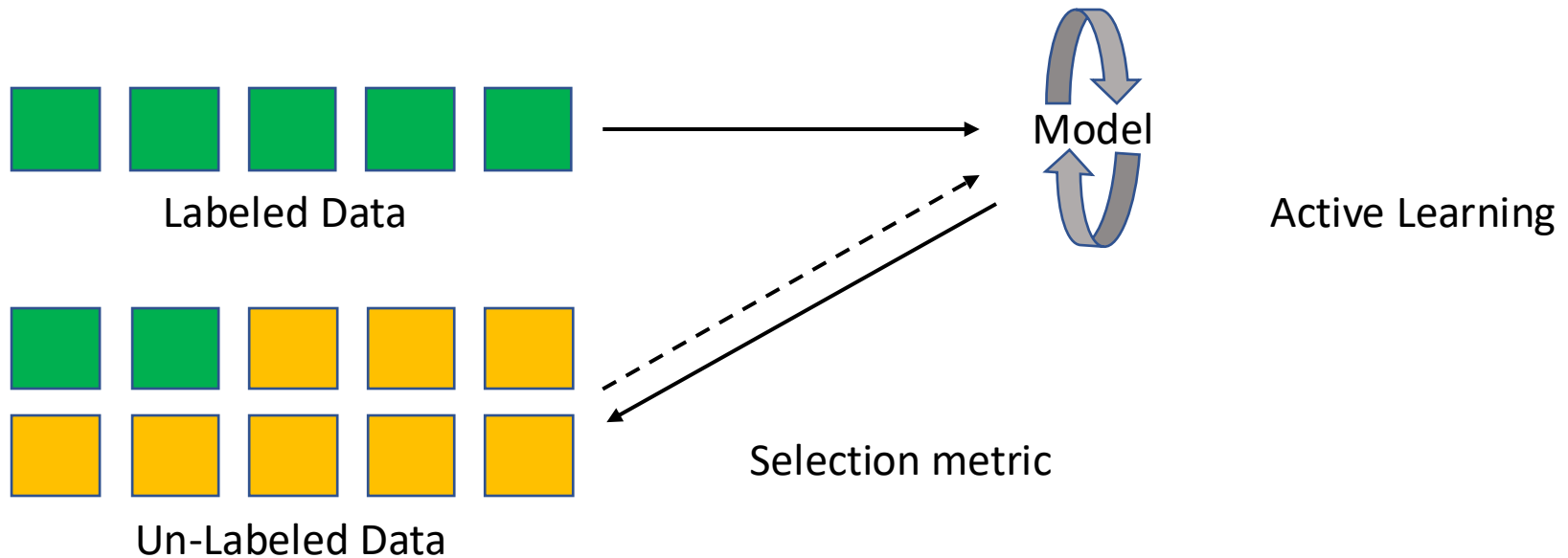


Labeled Data

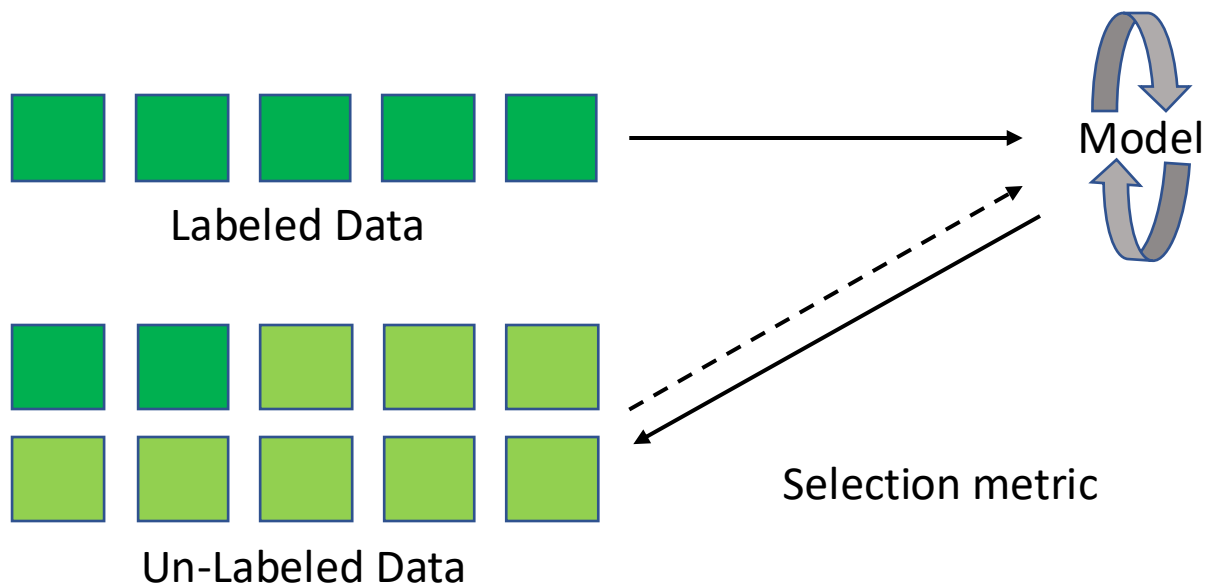
Terminology Overview



Terminology Overview

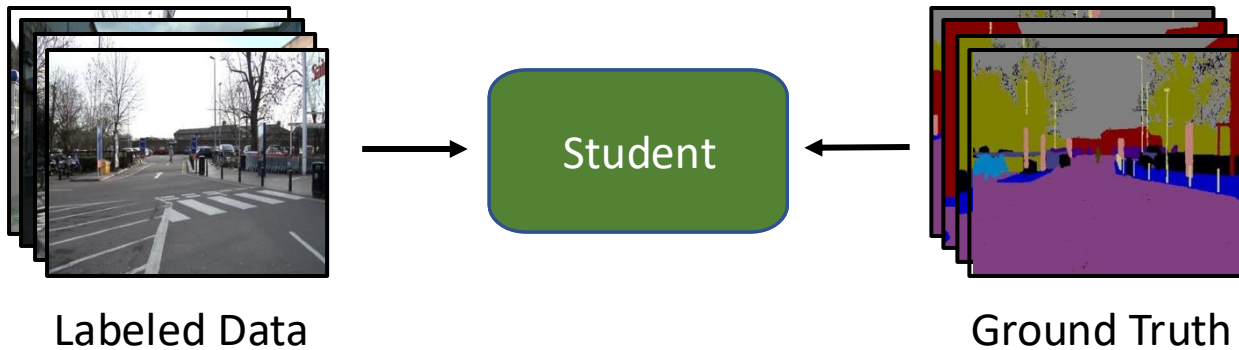


Terminology Overview

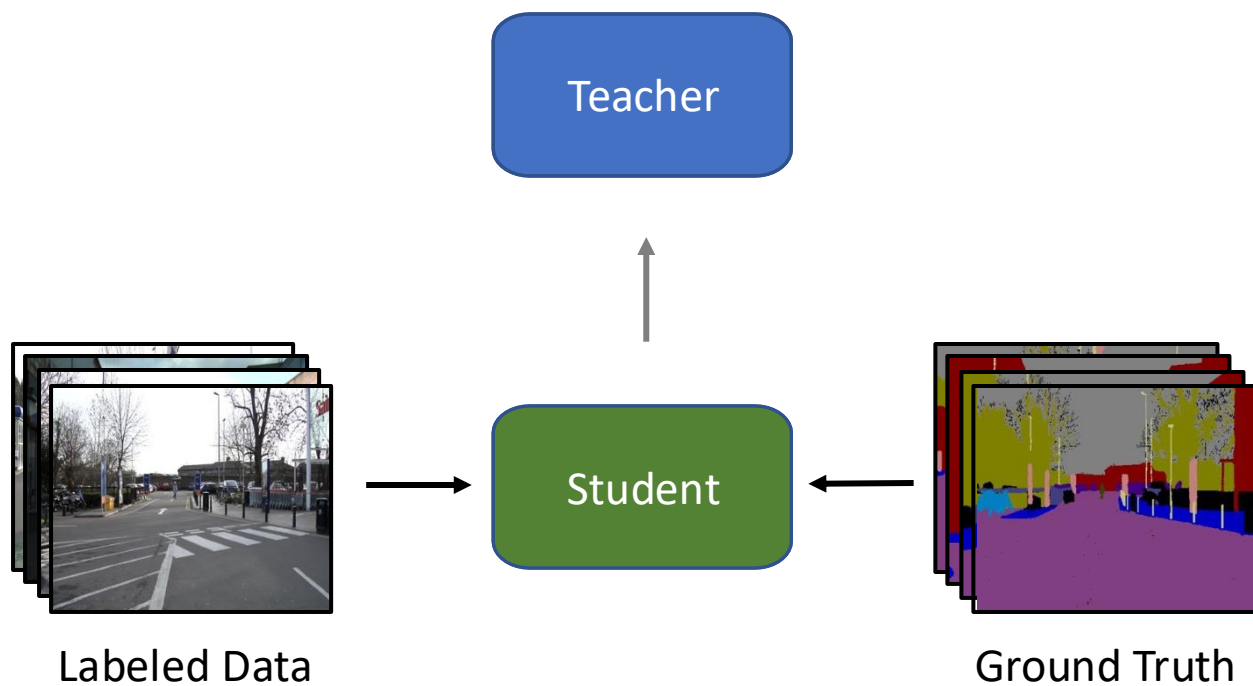


Active Learning +
Semi-supervised
Learning

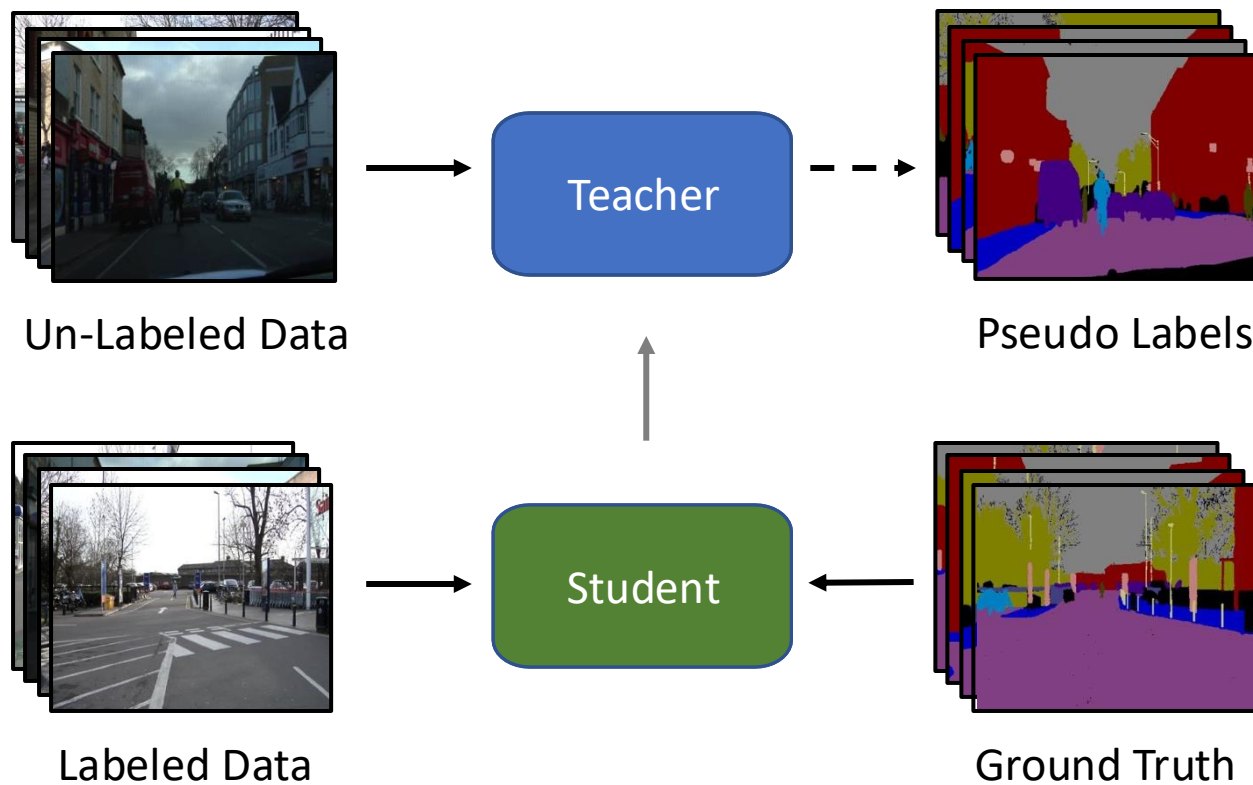
Framework



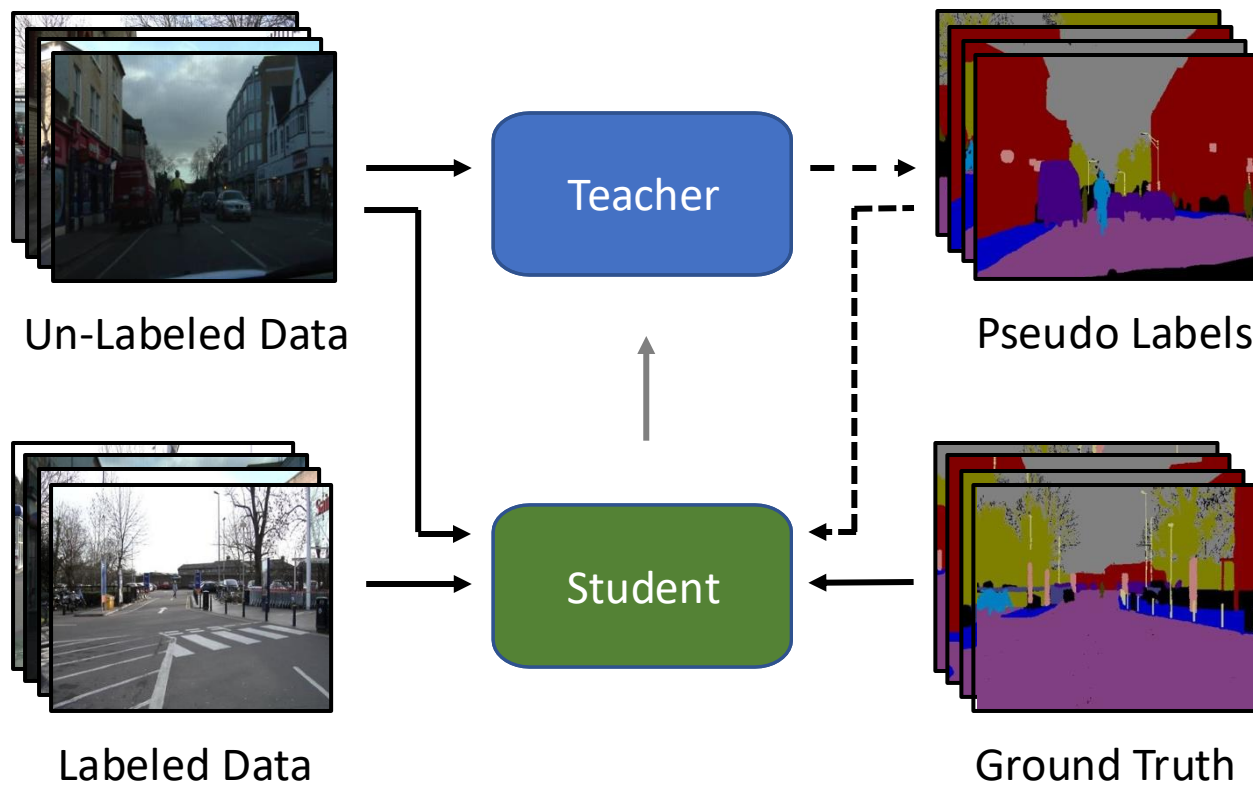
Framework



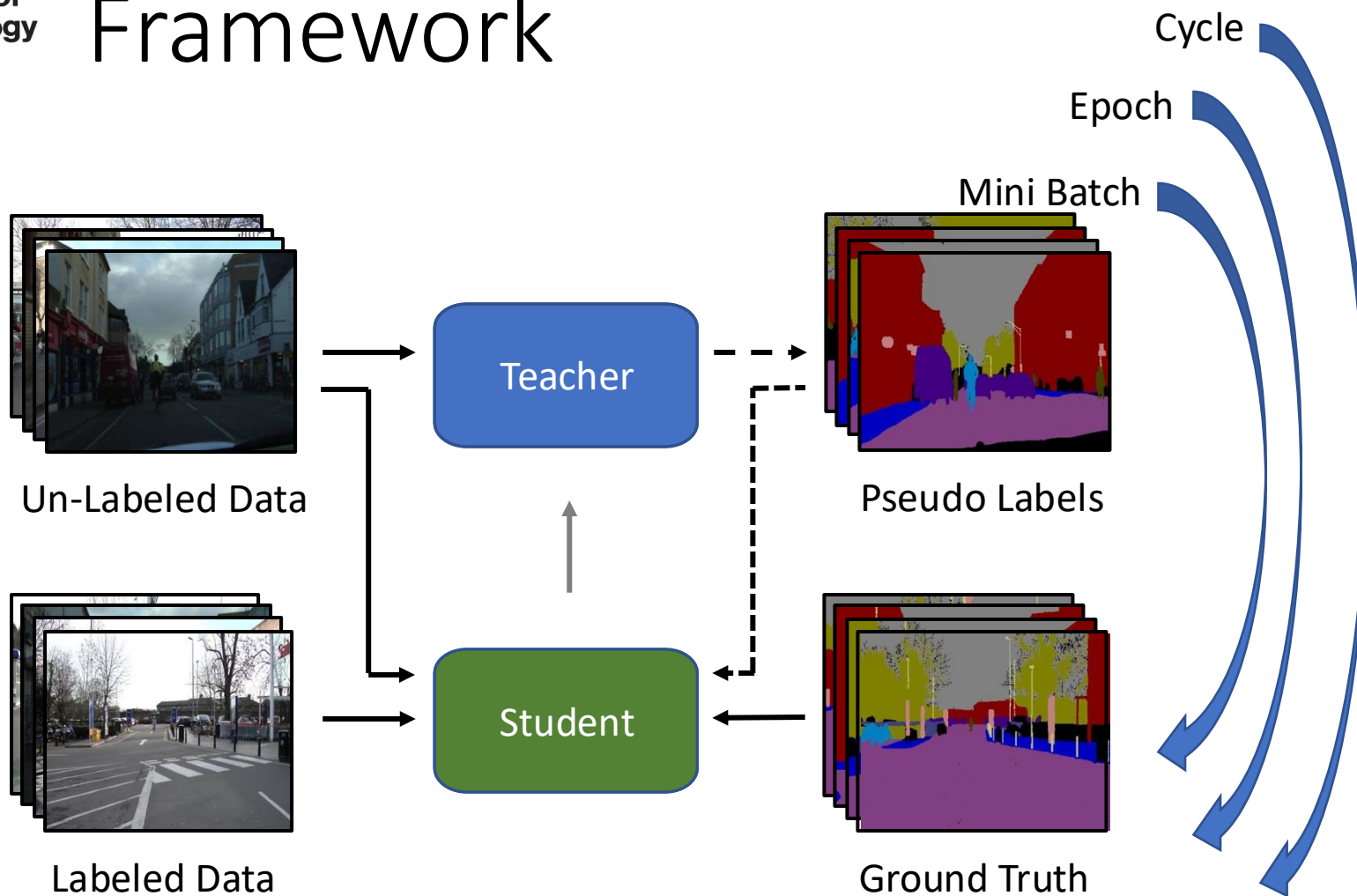
Framework



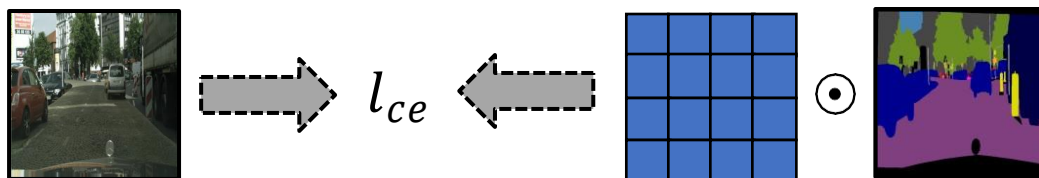
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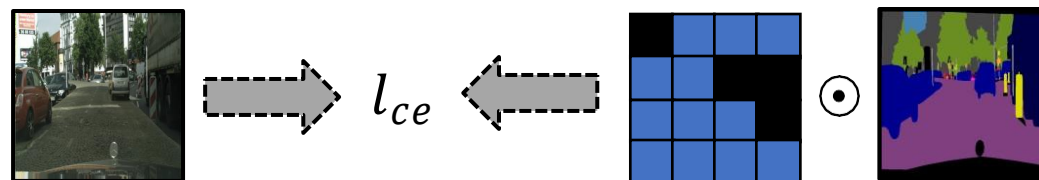
Framework



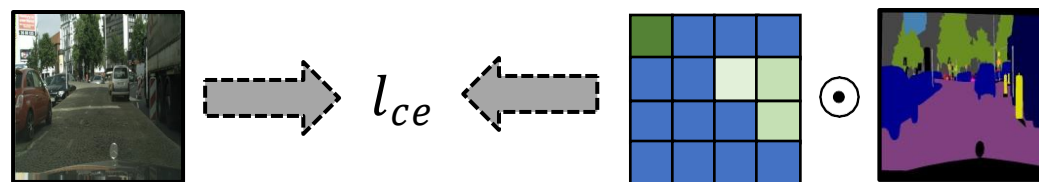
Framework



(a) Cross-Entropy (CE) Loss

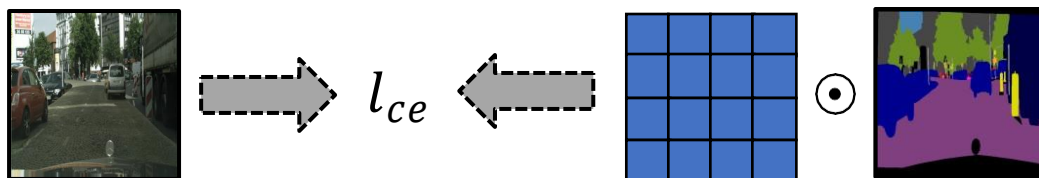


(b) Confidence-Threshold'ed CE Loss

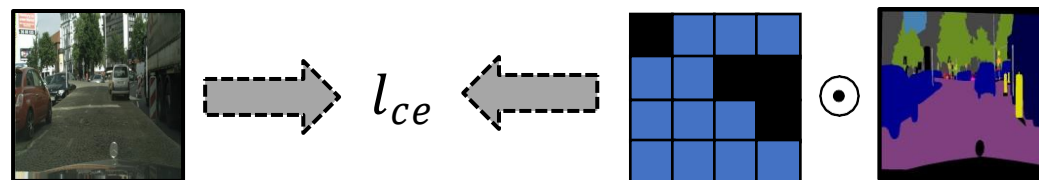


(c) Confidence-Weighted CE Loss

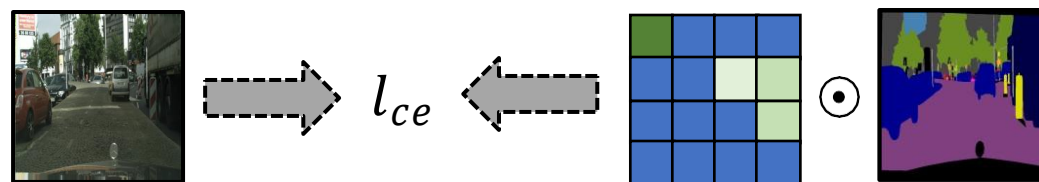
Framework



(a) Cross-Entropy (CE) Loss

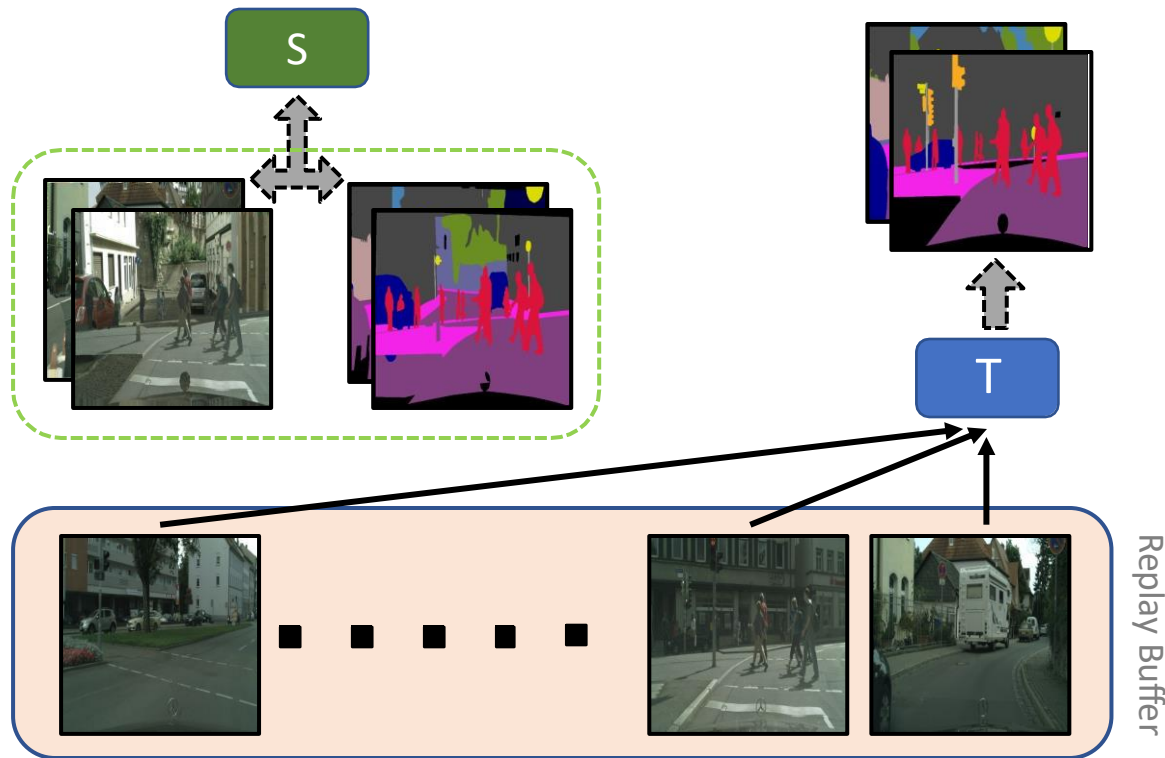


(b) Confidence-Threshold'ed CE Loss



(c) Confidence-Weighted CE Loss

Framework



Results

Pre-paper SOTA	Network Architecture	mIoU (100% Data)	% Data required to reach 95% of mIoU	mIoU at correspon ding % data	Ours	
					% Data required to reach 95% of mIoU	mIoU at correspon ding % data
CamVid – 11 classes						
DEAL	MBV2 – DLv3	64.5	40	62.1	13.8	62.3
EquAL	ResNet50 – DLV3	67.2	12	63.4	12.0	65.3
CityScapes – 19 classes						
DEAL	MBV2 – DLv3	65.7	40	61.6	16.3	64.8
VAAL	DRN	62.95	30	58.4	16.3	60.9

Results

Component-wise analysis		
MBV2 – DLv3	CamVid	CityScapes
Student-Teacher	61.2	61.4
w/ Confidence Weighting	61.7	62.5
w/ Balanced ClassMix	62.3	64.8

Thank you for watching!

<https://github.com/aneesh3108/S4AL>