Motivation

MORE EFFICIENT ANNOTATION FOR SEGMENTATION.

Low cost
High performance

Overview of Contributions
- Crowdsolver-friendly pixel-level annotation pipeline with small spatial-region annotation primitive.
- Competitive weakly-supervised semantic segmentation, outperforming existing approaches by 3-4%.
- Equivalent segmentation performance to full image pixel-level labels with half of the number of annotated pixels.
- Automatic conversion to full image pixel-level labels through label inpainting of block-annotated images.

Block Annotation

Question: How do crowdworkers respond to pixel-level annotation for small spatial regions?

Block Annotation Task

Amazon MTurk workers are given a highlighted block region to annotate, along with the entire image as context.

Block Annotation vs. Full-Image Annotation

SUNCG. All segments are crowdsourced. Left to right: (a) Ground truth (b) Block annotation (zoomed-in) (c) Full-image annotation (zoomed-in) (d) Block annotation (e) Full-image annotation. Small stool is missed by full-image annotation in this example (b vs c). The boundaries across different block tasks line up well (d vs e).

Cost and Worker Feedback

Question: How useful are block annotations for semantic segmentation?

Cost and Worker Feedback Question

Nice! “Good” “Great” “Fast” “Happy” “Easy” “Okay” Release More HITs
1 2 3 4 5 6

Overwhelmingly positive feedback from workers. 24 sentiments expressed by 19 worker responses over two studies on Cityscapes and SUNCG.

User study on SUNCG. Crowdworkers produce higher quality annotations while demanding a lower wage. Total cost per image is equivalent.

See our paper for more results!

Acknowledgements
This work was supported in part by NSERC (PGS-D) and PERISCOPE MURI Contract #N00014-17-1-2699.