Data exploitation: detection and segmentation with partially annotated data
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1. Motivation

Multi-task learning: learns interrelationship between tasks
▶ requires annotations of all tasks for each training example
▶ partially annotated data: each example is annotated for a single task;
▶ more data but hard to learn cross-task features

2. Experimental Setup

Datasets: Pascal VOC + augVOC: 20 categories
Object detection
▶ 7,558 images
▶ 3,776 images
Semantic segmentation
▶ 7,656 images
▶ 3,825 images

Metrics: mAP@[.5:.95]

Network: RetinaNet = ResNet family + FPN family
Segmentation head: FPN panoptic [1]
Knowledge distillation: feature imitation using MSE

3. Architecture

4. Multi-task partial annotation

5. Deviation

Different target categories: segmentation on 4 classes
▶ transportation, animals, furniture, person

Out-of-domain inputs: segmentation on Cityscapes

6. Multi-task learning with Knowledge Distillation

7. Qualitative Results

Conclusions
Combining training data for different tasks helps
▶ cross-task optimization by self-training improves further
Deviation of tasks is to be studied
▶ different target categories ▶ different domains of inputs

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References

https://lhoangan.github.io/multas