Weakly Supervised Object Localization with Progressive Domain Adaptation

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Highlights
- Weakly supervised learning of object detectors

Proposed Approach - progressive domain adaptation

I. Classification adaptation:

Goal: ImageNet single-label classification → multi-label classification

- Proposed multi-label loss
  - Softmax loss for binary classification of each class
  - Summation of softmax losses over all classes

II. Detection adaptation:

Goal: multi-label classification → object detection

- class-specific proposal mining
- multiple instance learning
- detector training

Comparisons to the state-of-the-arts:
- VOC'07
- VOC'10, '12 and ILSVRC'13

Experiments

Methods | mAP VOC'10 | mAP VOC'12 | mAP ILSVRC'13
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Ginibi et al. CVPR'14 | 22.4 | - | -
Song et al. ICMU'14 | 22.7 | - | -
Song et al. NIPS'14 | 24.6 | - | -
Bilen et al. BMVC'14 | 26.4 | - | -
Bilen et al. CVPR'15 | 27.7 | - | -
Wang et al. ECCV'14 | 31.6 | - | -
OM + MIL | 23.4 | - | -
OM + FT-AlexNet | 19.5 | - | -
MIL + FT-AlexNet | 23.0 | - | -
OM + MIL + FT-AlexNet | 31.0 | - | -
OM + FT-VGGNet | 20.5 | - | -
MIL + FT-VGGNet | 26.2 | - | -
OM + MIL + FT-VGGNet | 39.5 | - | -

Error analysis:

- Vehicles
- Animals
- Furniture

Percentage of each task

Total detections (≤ 450)

Total detections (≤ 490)

Total detections (≤ 490)