



Weakly Supervised Instance Segmentation using Class Peak Response

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1 Motivation

Image Pixel-level Supervision

Image-level Supervision
horse

Image-level labels are much cheaper and easier to define.

Cutting-edge instance segmentation methods require expensive rich annotated data for training deep models.

2 Our Goal

Discover cues for each class and instance

Enable classification networks for **instance mask extraction**

3 Method

Class Peak Response

Peak Response Map

Visual concepts **within a single instance**

bird category representations

Multi-instances are **difficult** to form a **stable pattern**

We leverage class peak responses to extract **fine-detailed instance-aware visual cues** from classification networks

DCNNs trained using **standard** classification settings with **negligible** overhead

Training

Inference

FCN Classifier

Peak Stimulation

Peak Response Map

Peak Backpropagation

Prediction

Query Rank

NMS

Segment Proposals

The generation and utilization of **Peak Response Maps**

4 Experiment Results

Method	VOC12	COCO
WILDCAT	82.9	53.5
SPN	82.9	55.3
PRM(Ours)	85.5	57.5

Significant improvement in **Pointwise Localization (mAP)**

Visualization shows clearer representations are learned via **Peak Stimulation**

High-quality instance-aware visual cues are obtained via **Peak Backprop**

Image	PRM	Prediction	GT	Typical failure

5 Application

Method	GTbbox	MELM*	SPN	PRM(Ours)
mAP _{0.5}	38.0	22.9	12.7	26.8

PRM has **great potential**

6 Conclusion

◆ A **simple yet effective** technique for weakly supervised instance segmentation using instance-aware cues from classification CNNs

← Scan to get Paper & Code

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