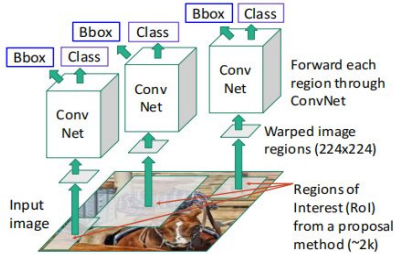
Weekly Report

weihang

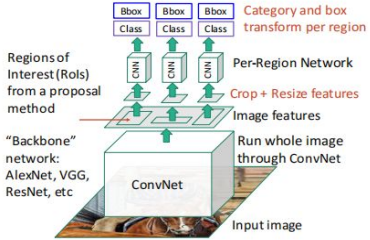
Faster Rcnn 家族

R-CNN	Fast R-CNN	Faster R-CNN
1.用**计算**的方式找ROIs 2.对每个ROI卷积，得到bbox和class	1.先**卷积**，得到feature空间，再用**计算**的方式找ROIs 2.对每个ROI卷积，得到bbox和class	1.Region Proposal Network**(RPN)**直接对图片进行卷积，得到ROIs 2.对每个ROI卷积，得到bbox和class

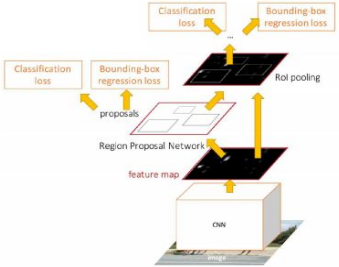
"Slow" R-CNN: Run CNN independently for each region



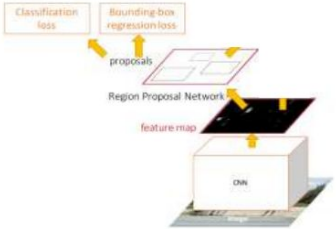
Fast R-CNN: Apply differentiable cropping to shared image features



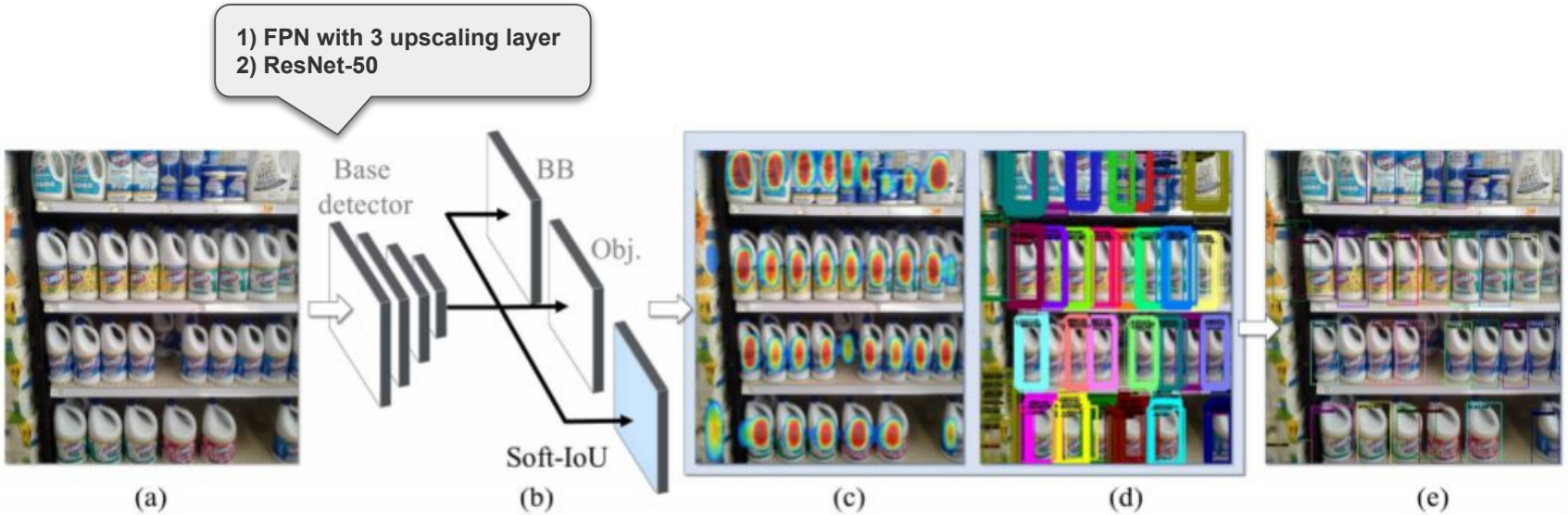
Faster R-CNN: Compute proposals with CNN



Single-Stage: Fully convolutional detector



Precise Detection in Densely Packed Scenes



$$\mathcal{L}_{\text{sIoU}} = \quad (2)$$
$$-\frac{1}{n}\sum_{i=1}^{n}[IoU_i \log(c_i^{iou}) + (1-IoU_i)\log(1-c_i^{iou})],$$

$$\mathcal{L} = \mathcal{L}_{\text{Classification}} + \mathcal{L}_{\text{Regression}} + \mathcal{L}_{\text{sIoU}}. \quad (3)$$

EM-Merger:

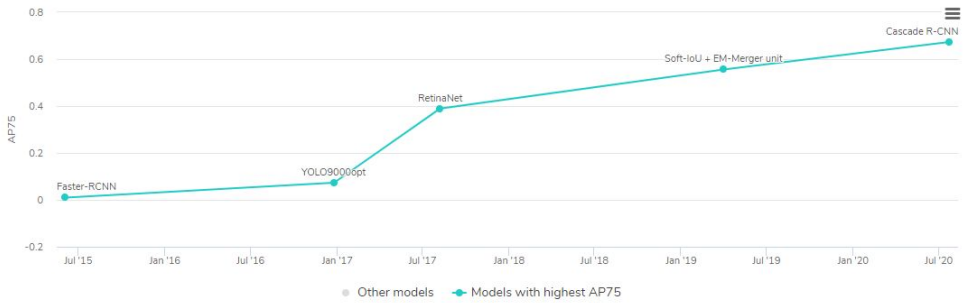
1. converts **Soft-IoU to Gaussians**
2. **EM-approach**, minimize overall **KL** distance, to resolve best K gaussians
3. Produce one sigle detection per object, totally

$$K = size(\mathbf{I})/(\mu_w \mu_h),$$

Futher Reading

- **Focal loss** for dense object detection.
- A Solution to Product detection in Densely Packed Scenes.
  (Cascade R-CNN)(which performs No.1 on SKU-110K, better than Soft-IoU + EM-Merger unit)
- RetinaNet
- Mask R-CNN
- KL distance

Dense Object Detection on SKU-110K



View AP75 Edit

RANK	MODEL	AP	AP75	PAPER	CODE	RESULT	YEAR
1	Cascade R-CNN	0.587	0.673	A Solution to Product detection in Densely Packed Scenes			2020
2	Soft-IoU + EM-Merger unit	0.492	0.556	Precise Detection in Densely Packed Scenes			2019
3	RetinaNet	.455	.389	Focal Loss for Dense Object Detection			2017
4	YOLO9000opt	.094	.073	YOLO9000: Better, Faster, Stronger			2016
5	Faster-RCNN	.045	.010	Faster R-CNN: Towards Real-Time Object Detection with Region Proposal Networks			2015