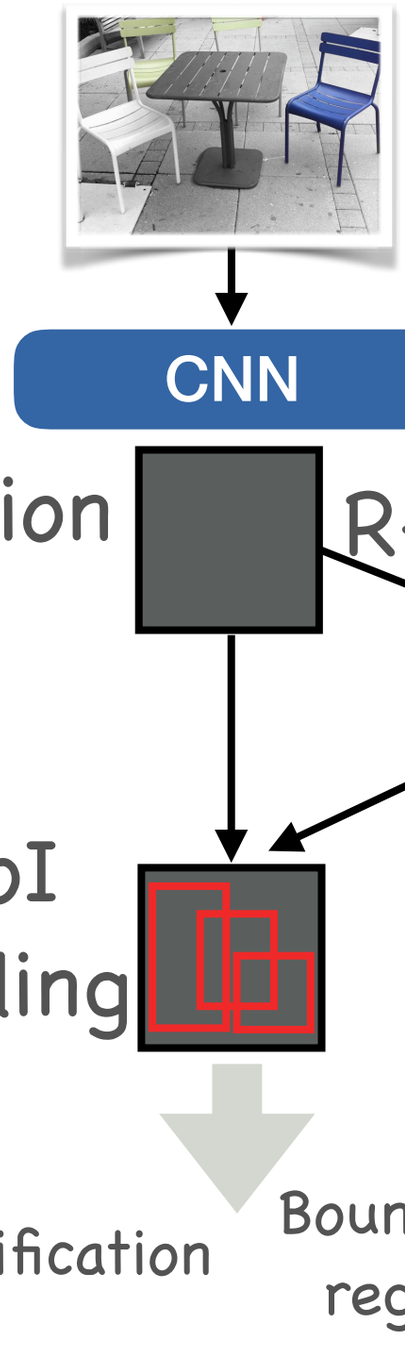
Case study: RetinaNet

Single stage detection

- Object detection without cropping
- Use region proposal network for classification



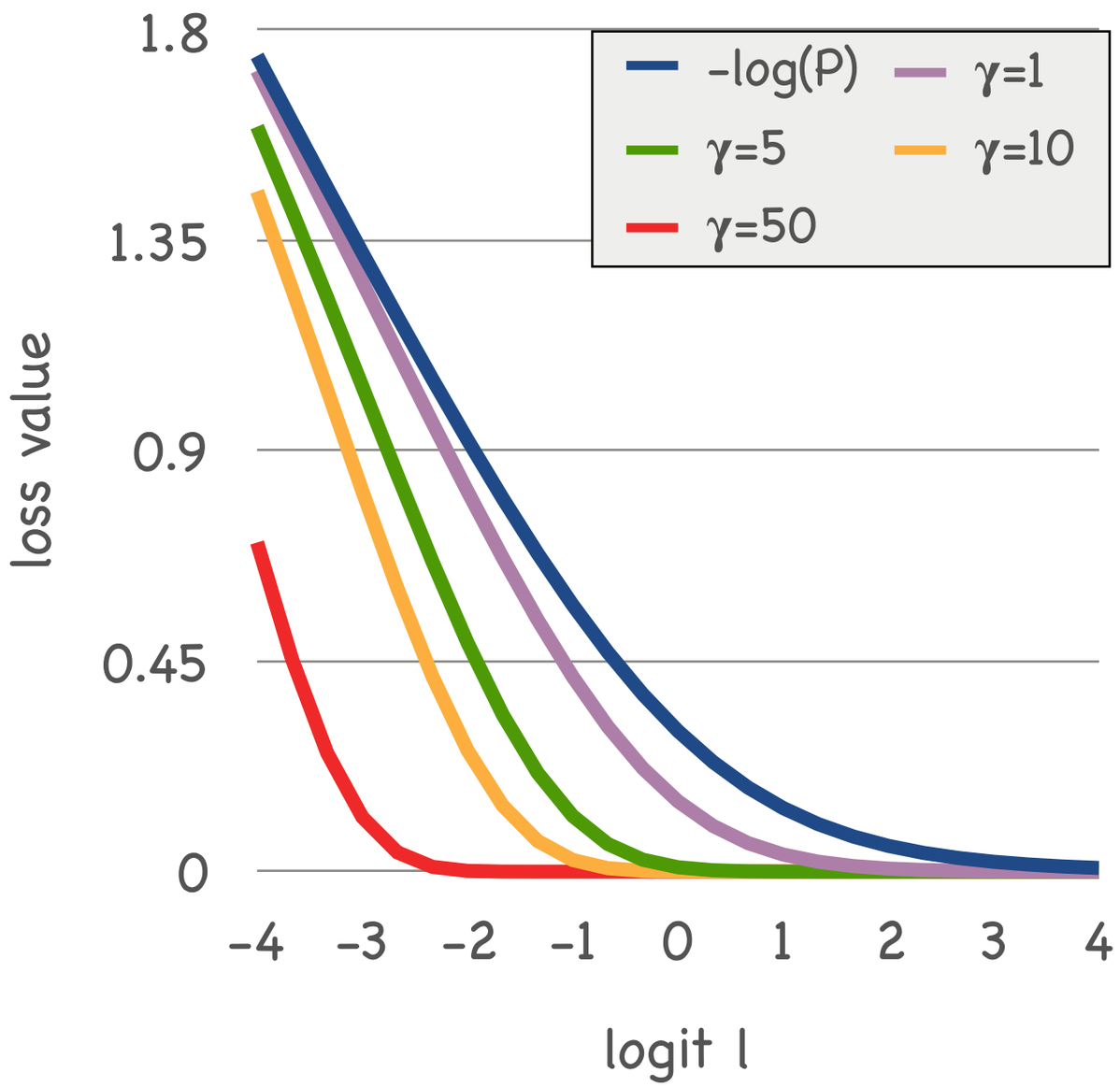
Focal Loss for Dense Object Detection, Lin et al., ICCV 2017
You Only Look Once: Unified, Real-Time Object Detection, Redmon et al., CVPR 2016

Single stage detection - issues

- End-to-end training
  - More negative examples than positives
- Solution: Weighted loss

RetinaNet

- Focal loss:
  - $-(1-p(y))^{\gamma}\log p(y)$
- With $p(y=1)=\dfrac{1}{1+\exp(-l)}$
- Allows for different weight on positives and negatives



Summary

- Focal loss
  - Used beyond object detection
    - Imbalanced training labels
- RetinaNet
  - Single stage
  - Faster than FasterRCNN