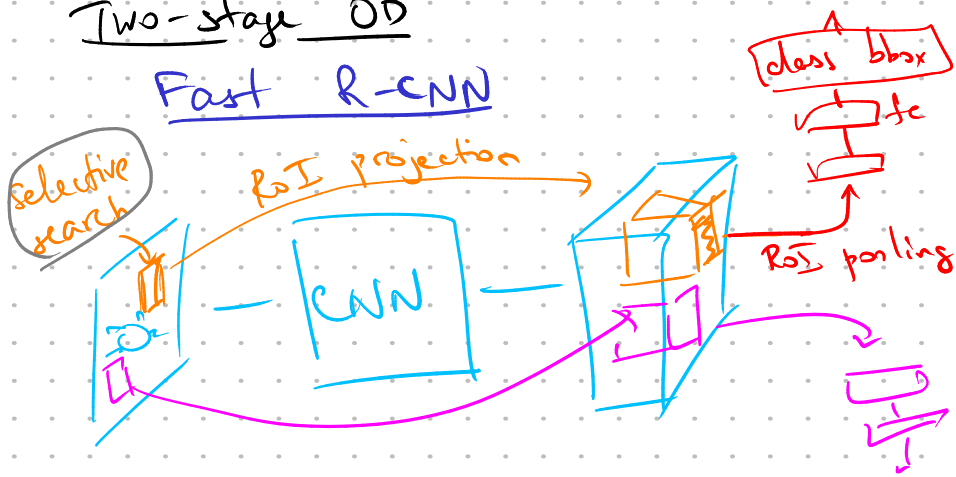
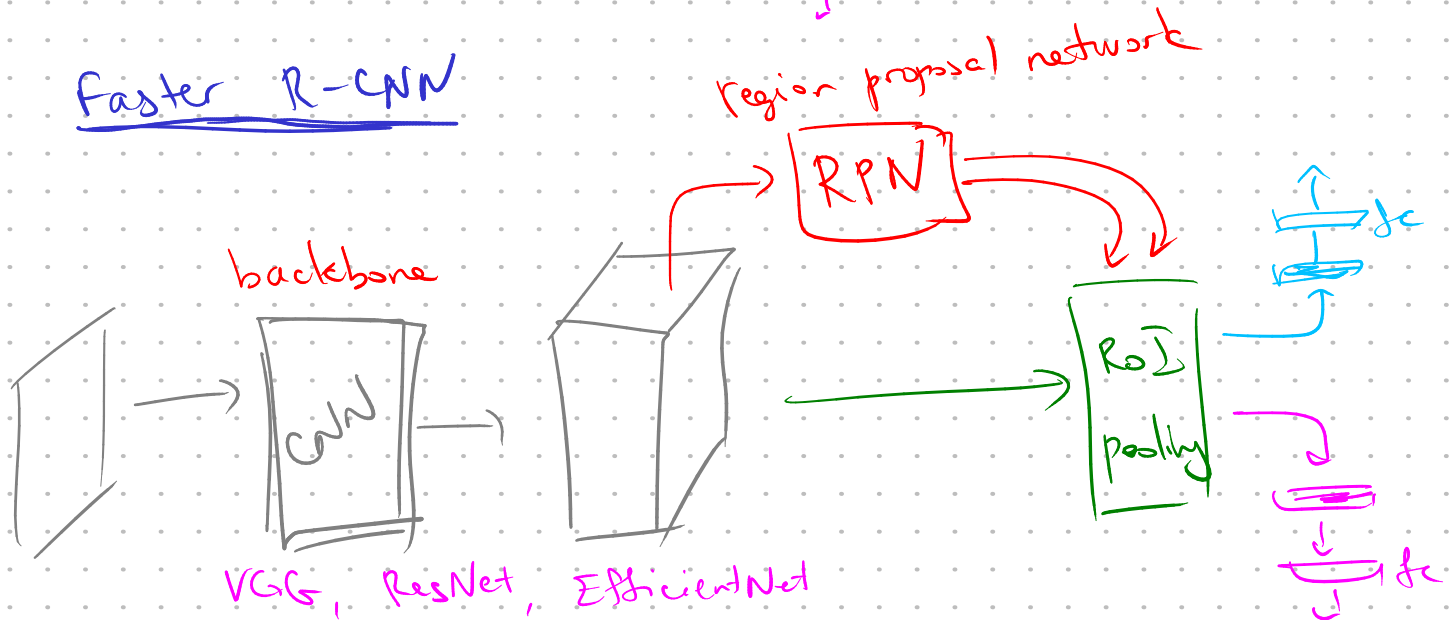


## Two-stage OD

### Fast R-CNN



### Faster R-CNN



## One-stage OD

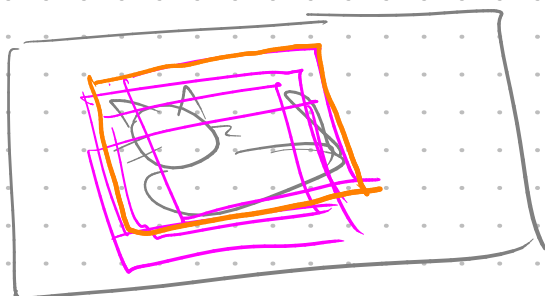
yolo

$$L = \lambda_1 \sum_{i=0}^{S^2} [Obj_{ij}] \cdot \sum_c (p_i(c) - \hat{p}_i(c))^2$$

$$+ \lambda_2 \sum_{i=0}^{S^2} \sum_{j=0}^B [Obj_{ij}] \left( (x_i - \hat{x}_i)^2 + (y_i - \hat{y}_i)^2 + (\sqrt{w_i} - \sqrt{\hat{w}_i})^2 + (\sqrt{h_i} - \sqrt{\hat{h}_i})^2 \right)$$

$$+ \lambda_3 \sum_{i=0}^{S^2} \sum_{j=0}^B [Obj_{ij}] \cdot (conf_i - 1)^2$$

$$+ \lambda_4 \sum_i \sum_j (1 - [Obj_{ij}]) \cdot (conf_i - 0)^2$$



non-maximum suppression.

# Hierarchical softmax

