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Reference:

Github - Pytorch YoLov1

<https://github.com/xiongzihua/pytorch-YOLO-v1/blob/master/yoloLoss.py>

1. ( 5%) Print the network architecture of your YoloV1-vgg16bn model and describe your training config. (optimizer, batch size….and so on)

Input size: (3, 448, 448)

Layer: (Layer Name: Output size)  
　VGG16-bn: (512, 7, 7)  
　Flatten-layer: (25088)  
　Fully Connected: (4096)  
　# BatchNorms1D: (4096)  
　LeakyReLU(0.02): (4096)  
　Dropout(0.5): (4096)  
　Fully Connected: (1274)   
　Sigmoid: (1274)  
　Reshape: (7, 7, 26)

Optimizer: SGD  
Batch Size: 16  
Momentum: 0.9  
Weight Decay: 1e-4  
Learning Rate:   
(1-20 Epoches) 1e-3  
(21-40 Epoches) 1e-4  
(41-60 Epoches) 1e-5  
(61-70 Epoches) 1e-6

NMS setting:  
Keep bounding box: 0.1  
IOU threshold: 0.5 (Remove when IOU>0.5)

1. (10%) Show the predicted bbox image of “val1500/0076.jpg”, “val1500/0086.jpg”, “val1500/0907.jpg” during the early, middle, and the final stage during the training stage. (For example, results of 1st, 10th, 20th epoch)

1. (10%) Implement an improved model which performs better than your baseline model. Print the network architecture of this model and describe it.

Input size: (3, 448, 448)

Layer: (Layer Name: Output size)  
　VGG16-bn: (512, 7, 7)  
　Flatten-layer: (25088)  
　Fully Connected: (8192)  
　ReLU: (8192)  
　Dropout(0.5): (8192)  
　Fully Connected: (5096)   
　Sigmoid: (5096)  
　Reshape: (14, 14, 26)

1. (10%) Show the predicted bbox image of “val1500/0076.jpg”, “val1500/0086.jpg”, “val1500/0907.jpg” during the early, middle, and the final stage during the training process of this improved model.

1. (15%) Report mAP score of both models on the validation set. Discuss the reason why the improved model performs better than the baseline one. You may conduct some experiments and show some evidences to support your reasoning.

mAPs of basic model:

mAPs of improve model:

1. **bonus (5%)** Which classes prediction perform worse than others? Why? You should describe and analyze it.