Computer Vision (ELL 793)

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Assignment 3

Problem

a) Train a CNN network with ResNet-18 as a backbone from scratch with CIFAR-10 and note down the performance.

b) Initialize the ResNet-18 network with pretrained weights from ImageNet and then try to use these weights to improve the training for the CIFAR-10 dataset. Try to come up with different ways of using these weights to improve the performance and play with the hyper-parameters to get the best performance. Document the results of your experiments.

(c) Train the network from scratch with Tiny-CIFAR-10 dataset. Try using as many data augmentation techniques as you can think of to try to improve the performance. Try dropout after different layers and with different dropout rates. Document the results of your experiments.

d) Visualize the activations of the CNN for a few test examples in each of the above cases. How are the activation in the first few layers different from the later layers?

Note: For Tiny-CIFAR-10 dataset, take 500 images per class from CIFAR-10 for training. Use the same 10,000 images for testing as per CIFAR-10 dataset. It is recommended to use Pytorch for this problem.