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CS 7015 : Deep Learning

Assignment 3 (Programming)

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In this assignment, you will learn the significance of pretrained models and data augmentation strategies. The assignment specification is given below:

Dataset

- **CIFAR-10 dataset :** 60000 32×32 colour images in 10 classes, with 6000 images per class. There are 50000 training images and 10000 test images. URL: `https://www.cs.toronto.edu/~kriz/cifar.html`

- **Tiny-CIFAR-10 :** Take 500 images per class from CIFAR-10 for training. Use the same 10000 images for testing as per CIFAR-10 dataset.

Model Architecture

ResNet-18

Experiment-1 (Transfer Learning)

1. Train the network from scratch with CIFAR-10 (5000 images per class) and note down the performance.

2. Initialize the 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.

Experiment-2 (Exploring Data Augmentation)

1. Train the network from scratch with Tiny-CIFAR-10 (500 images per class. Try using as many data augmentation techniques as you can think of to try to improve the performance.

2. Try using pre-trained weights from imagenet to further improve the performance (in combination with the data augmentation above).

3. Try dropout after different layers and with different dropout rates.

Document the results of your experiments.

Note

- We recommend PyTorch to implement the assignment.

Submission requirements

Create a report containing (atleast) the below contents along with your observations:

- Train and test error plots

- Train and test accuracy plots

Plagiarism

- You should do the assignment yourself. In case you take help from others, please mention in the pdf submitted.

- No sharing of code/experiments etc. will be allowed under any circumstances and may attract disciplinary action by the institute disciplinary committee.

Suggested Programming languages :

Python

Submission Guidelines

- **Dead line : 06/10/2019 11:59 PM**

- **PDF Upload:** `https://www.turnitin.com`. Naming format as used earlier.

- **Code Upload:** Using Moodle. Naming format as used earlier.

- Email submissions will not be accepted. Reduce file size (if required).

- This is not a team assignment.

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