CSC 417/617/717 Deep Learning in Computer Vision (Fall 2024)

Assignment #2, Convolutional Neural Networks

Due: 2 pm, Oct. 3rd

Problem I. This assignment is for you to get familiar with training techniques for convolutional neural networks by improving a given TensorFlow sample code. It uses CIFAR dataset as the training and testing datasets. Apply Steps 1 and 2 below to the given code.

Code: Download the Jupyter Notebook file available on Canvas (Files >> 2_Code >> HW2_CNN_CIFAR.ipynb).

Step 1. Modify the code so that the architecture can be

CONV: 32 3x3 filters (stride 1, padding 1)

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BatchNorm (Batch normalization with no arguments)

MAX POOL: stride 2

CONV: 64 3x3 filters (stride 1, padding 1)

CONV: 64 3x3 filters (stride 1, padding 1)

MAX POOL: stride 2

FC: 128 neurons

Step 2. Set the number of iterations in the model optimization process to 20 and run through the model.

References: https://keras.io/api/

Problem II. This assignment is for you to understand and practice a transfer learning case. It uses one of pre-trained models on ImageNet available in TensorFlow.

Code:

https://colab.research.google.com/github/tensorflow/docs/blob/master/site/en/tutorials/images/transfer_learning.ipynb

Step 1. Modify the code for transfer learning from the VGG19 model.

Step 2. Finetune the model from the 16th layer.

References: https://keras.io/api/applications/

Submission: Submit a single Jupyter Notebook file or Zip file (if you have two Notebook files) via CANVAS. Use *Yourname_HW2.ipynb or .zip* as your submission filename.

NOTE: Make sure that you submit your code with all results displayed (otherwise, 25% of your points will be deducted).