Assignment 7 (Reference lecture: 08/28)

Due: 09/04 2:00 pm

Submission Instruction:

Step 1: A pdf file submitted on Gradescope. This file should contain the code and output. The easiest way to generate this file is to first do screenshots(Snipping Tool on Windows, Shift-Command-4 on Mac), then paste the screenshots on a word file and transform it into a pdf file. You can also directly transform an ipython notebook to pdf format: File -> Print Preview -> right click and Print -> change Print Destination to "Save as Pdf". You are welcome to share your proven method on piazza.

Step 2: Code file submission to either the email address(cse190na4ai@gmail.com) or your private repository. This file should match the pdf version in step 1 and will serve as a reference if we find some problems with the pdf file submitted.

Let $n, m, k = 15$ be size of one hidden layer linear neural network, i.e. it has 15 input/15 hidden/15 output neurons.

Given training example X_i =np.load('assignment7_X.npy'), and $W^1 = \text{np.load('assignment7\_W1.npy')}, W^2 = \text{np.load('assignment7\_W2.npy')}$. Let $f_W(X_i) = W^2W^1X_i$ denote the output of the one-hidden layer linear NN for input X_i.

Compute $\nabla_{W^1} f_W(X_i), \nabla_{W^2} f_W(X_i)$ (tensors) using the tensor backpropagation presented on slide 33. Output the computed gradients (tensors). Compute and output also numerical derivatives (gradient checking – backprop and numerical derivatives should be comparable).