**Hands-on Assignment 1**

Due Date: See Web

(For students choosing Option 1 only. HA1 and HA2 are mutually exclusive.)

**Objective:**

In the file “programming-assignment1.py”, there is a program that is designed to learn a softmax model for the Iris dataset (included). In the program, there is a function, ***compute\_softmax\_loss***, that computes the softmax loss and the gradient. It is left out. In this assignment, you are asked to write the function.

Here, the “softmax loss” refers to the cross entropy loss of the softmax model. It is given on Page 39 of L03.pdf. The formula for the gradient is given on Page 41. You will need to add a term for L2 regularization term in both cases.

When you run your program, it should print out something like the following:

Epoch 0: loss = 1.47, train\_acc = 0.3000, test\_acc = 0.4667

Epoch 10: loss = 0.38, train\_acc = 0.9750, test\_acc = 0.9667

Epoch 20: loss = 0.49, train\_acc = 0.6667, test\_acc = 0.7333

…

The numbers might be different due to randomness in parameter initialization and data batching.

The TA will test-run your code. The grading will be based on correctness of program and clarity of code structure, variable names and comments. Code conciseness will also be considered. For example, aggregations (sum or mean) over training examples in a mini-batch should not be done using loops. Instead, use appropriate functions in NumPy.

**Notes**:

1. **Submission format**: A single zip file with your .py file(s). No need to include the dataset. The zip file should be named Student\_ID\_Assign#.zip, i.e. 1234567\_Assign1.zip. Include a README.md file for any general comment and / or online reference used.
2. **headers:** Add the following headers at the beginning of your submission code:

"""

Student Name:

Student ID:

Assignment #:

Student Email:

Course Name:

"""

1. **Comments:** If your variable / function name is not self-explanatory, please add a comment

i.e. zn1 = np.argmax(score, axis=1)   #zn1 is my network output prediction

1. Make sure to use Python3 instead of Python2
2. Do not use additional libraries other than those imported in the given code.
3. If you need the help or made mistakes on submission, please email TAs directly.
4. Similarity penalty will not be applied to this assignment. However, the Turnitin report will be used as clues for manual plagiarism detection.

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