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MET CS 767 Assignment 2: Neural Nets Intro

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The purpose of this exercise is to give you practice with standard neural net implementations and their parameters. Architecture and parameter manipulation are essential elements of neural net application. We often start with an existing implementation and modify it.

Please use this Word file template for your response. Follow—and retain—these instructions in gray text. Insert your work in black where indicated. Keep in mind the evaluation matrix at the end as you do the work and use it to guide what you submit.

Complete this assignment with the maximal assistance of an AI generator such as ChatGPT. As described in the evaluation criteria, your work will be assessed in terms of *your value added* (not the AI-generated material itself). This consists of your prompts that you draw our attention to, together with your edits and additions to AI-generated material with your value added in red font. For figures, insert comments (in red) that describe clearly your value added. If you performed significant prompt work, please note that in comments within the relevant sections.

Use no more than 4 pages of 12-point text excluding figures, the gray instructions, and appendices. You can add as many appendices as you like, as per the instructions provided in the first appendix below.

Please attach a full transcript of your interactions with an AI. This does not have to be organized.

**Hints**:

* Be organized in your parameter value process; identify the metric for parameter improvement (e.g., accuracy); improve parameters one at a time (usually); keep track of performance results as you go.
* Here is one way to optimize parameter values—a kind of binary search. Suppose that the current parameter value is 3. We're looking to improve the result with a better parameter value. First, we measure the effect of halving the parameter’s value. If this (1.5) results an improvement, we halve again. If halving does not improve the result, we try doubling--6. If neither improves the result, we try in-between values: (3 + 1.5)/2 and (3 + 6)/2 etc.
* Keep in mind that chatGPT can be an excellent tutor.
* You can’t share your solution, of course, but if you locate a useful website (e.g., to modify a data set), share it with the class. You will benefit from resources that they share with you.
* Tailor your response to the evaluation criteria (at the end) as you respond.
* Leave ample time to edit your work. Editing can improve it substantially.

# How I modified data and/or code to attempt improvement

Copy the implementation [here](https://colab.research.google.com/drive/1TI76Pg5RYmlA0sTNthkqDhTjZWfIoZwn?usp=sharing) to your Google drive. Modify this code, attempt to improve the output, and report the results, (using this Word file as a template). Since the accuracy of the given implementation is already high, consider reducing the size of the MNIST training set—or using a set like [corrupted](https://www.tensorflow.org/datasets/catalog/mnist_corrupted) mnist—so that the baseline implementation leaves more room for improvement. (The application is less effective with fewer training data.) Note changes that make the result worse, with your best explanation.

## 1.1 Description of your modifications and reason(s) it could be an improvement (include the relevant code fragments)

your response replaces this

## 1.2 Comparison of the result with the original output

your response replaces this

## 1.3 URL of your Colab code

your response replaces this

# New Neural Net Application

## 2.1 Description of the application (include description of inputs, functionality, and outputs—in no more than ½ page. Identify a clearly obtainable data source. Avoid the neural net types that will be covered in future modules. Make this as unique an application as you can.)

your response replaces this

## 2.2 Summary of your parameter tuning

your response replaces this

## 2.3 Three illustrative input/output pairs from running the implementation

your response replaces this

## 2.4 Key code snippets, with explanation (the important code—in no more than a page)

your response replaces this

## 2.5 URL of your code (Colab code--or attach and explain how to run if necessary)

your response replaces this

# References

You are welcome to use the work of others—but only if you clearly indicate what work is theirs. Failure to do so is plagiarism. Each of your references should occur within the text; so for example [1] should occur below *and* within the body of your response at the relevant location. Include specific sections of the textbooks if used directly.

[1] your first reference replaces this

[2] …

# Evaluation

## 



# Appendix 1

…

# Appendix 2

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