**ECE 09495/09595**

**Assignment 1\_Jacob Matteo**

**Instructions**

1. Max Credit: 100 Points
2. All questions are from the Textbook – Dive into Deep Learning (<https://d2l.ai/>).
3. Submit a single PDF.

**Questions**

1. **Part – 1 (10 Problems) 50 points**
   1. **Section 3.1.6 – Q 1, 2 and 3.**
   2. A close up of a piece of paper

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   3. This function relates to the normal distribution as the closer b is to 0, the larger the value outputted by the function. This creates a normal distribution around b=0, shrinking as |b| tends towards |x|. However, b increases again as |b| increases beyond |x|.

2)

a.

b.

c.

d.

3)

a. A close up of text on a white background

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b.

c. In a stochastic gradient, this function iterates to a point in which the algorithm can no longer minimize loss and will bounce between a minimal-loss setting and a much higher-loss setting.

* 1. **Section 3.2.9 – Q 5, and 7.**

5) The reason the reshape function is needed in the square\_loss function outputs a 1D array rather than an n by d matrix, so the reshape function is there to put the outputted values back in the correct locations

7) When data\_iter’s batch size does not evenly divide the number of examples, this causes unpredictable behavior which results in incorrect values as the function will land between entries (the location it ends up on isn’t a whole number) so the function breaks down.

* 1. **Section 3.4.9 – Q 1, 2, and 3.**

1)

a.

b.

2)

a.

b.

3)

a.

b.

c.

d.

e.

* 1. **Section 3.6.8 – Q 4.**

4) While usually you would want your algorithm to return the most-likely label, this is not always the case. For example, if you had an algorithm which separated types of mushrooms for you to eat, you would want to be absolutely sure the mushroom you pick isn’t poisonous. Even 1% likely can be too high in circumstances such as this.

* 1. **Section 3.7.6 – Q 1.**

a)A close up of a map

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* + 1. What is the accuracy of your best model after hyperparameter tuning?

Roughly 8 ¼ with stock settings except epochs # = 100.

* + 1. Provide a plot of epochs vs. train and test accuracy.

A close up of a map

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1. **Part – II 50 points**
   1. Complete your submission of Predicting House Prices on Kaggle – Section 4.10

<https://d2l.ai/chapter_multilayer-perceptrons/kaggle-house-price.html#predicting-house-prices-on-kaggle>

* 1. Attach the screenshot of your submission in the PDF file.

A screenshot of a cell phone

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