Spring 2021

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Assignment 1 A↗

[New Attempt]

Due Apr 13 by 5:59pm   **Points** 6   **Submitting** a text entry box or a file upload

Posting the homework now: the invitation to "Register for Lab - Deep Learning DSVM" should go out this morning ...

Question 1 (1 point):

Suppose we have scaled the inputs for a one parameter linear regression problem and ...

```
x = -0.10      # our input variable
y = -0.10      # our output variable
w =  1.00      # the actual parameter
w_hat = 1.10   # our current estimate of the parameter
learning rate = 0.1
```

a) If our prediction is y_hat = w_hat * x [i.e. we're using a linear activation function], what is the value of the mean squared error loss function for this example?

b) What is the gradient of the mean squared error loss with respect to the weight estimate w_hat?

```
Don't forget to use the chain rule:
gradient = (partial derivative of loss with respect to activation)
         * (partial derivative of activation with respect to product)
         * (partial derivative of product with respect to weight)
```

c) What is the updated estimate of w_hat? We are using gradient descent, so new_weight = old_weight - learning_rate * gradient.

d) What is the value of the mean squared error loss function for this example, after updating the weight? Has "learning" reduced the loss function?

Model 1 (5 points):

Navigate to https://www.kaggle.com ↗ and register an account with your name@uw.edu email address. For your display name, pick the name of your favorite city [or one of these: https://en.wikipedia.org/wiki/List_of_largest_cities ↗]. Please include your display name when submitting your homework answer.

After you have registered with Kaggle, please navigate to the following URL to accept the invitation for this Kaggle task:

https://www.kaggle.com/t/5d6ba9f21ff34e17b69cb0b8b1c425cc ↗

After you have accepted the invitation, you should create an authentication token [you only have to do this once for the class]:

- Click on the picture of the goose in the upper, righthand corner
- Select Account from the menu
- Click the button that says "Create New API Token": it downloads kaggle.json

Now you should go to https://gmail.uw.edu ↗ and find your invitation to "Register for Lab - Deep Learning DSVM":

- Click the "Register for the lab" button in the email
- Turn your Data Science Virtual Machine (DSVM) on [by clicking the button]
- Select "Reset password" [from the "More actions menu" (3 vertical dots)] to assign the password for the username "deeplearning"
- Select "Connect via ssh" [from the "Connect menu" (connector icon)] to get the hostname and port number for your Virtual Machine (VM)
- Install the "PuTTY" secure shell (ssh) client software; e.g. choose "MSI (Windows Installer)" if you're using Windows [Ubuntu and MacOS already has an ssh command]: Download PuTTY: latest release (0.74) (greenend.org.uk) ↗
- Use the putty ssh client to connect to your VM [fill in the "Host Name" and "Port" values for your VM, then click the "Open" button]:
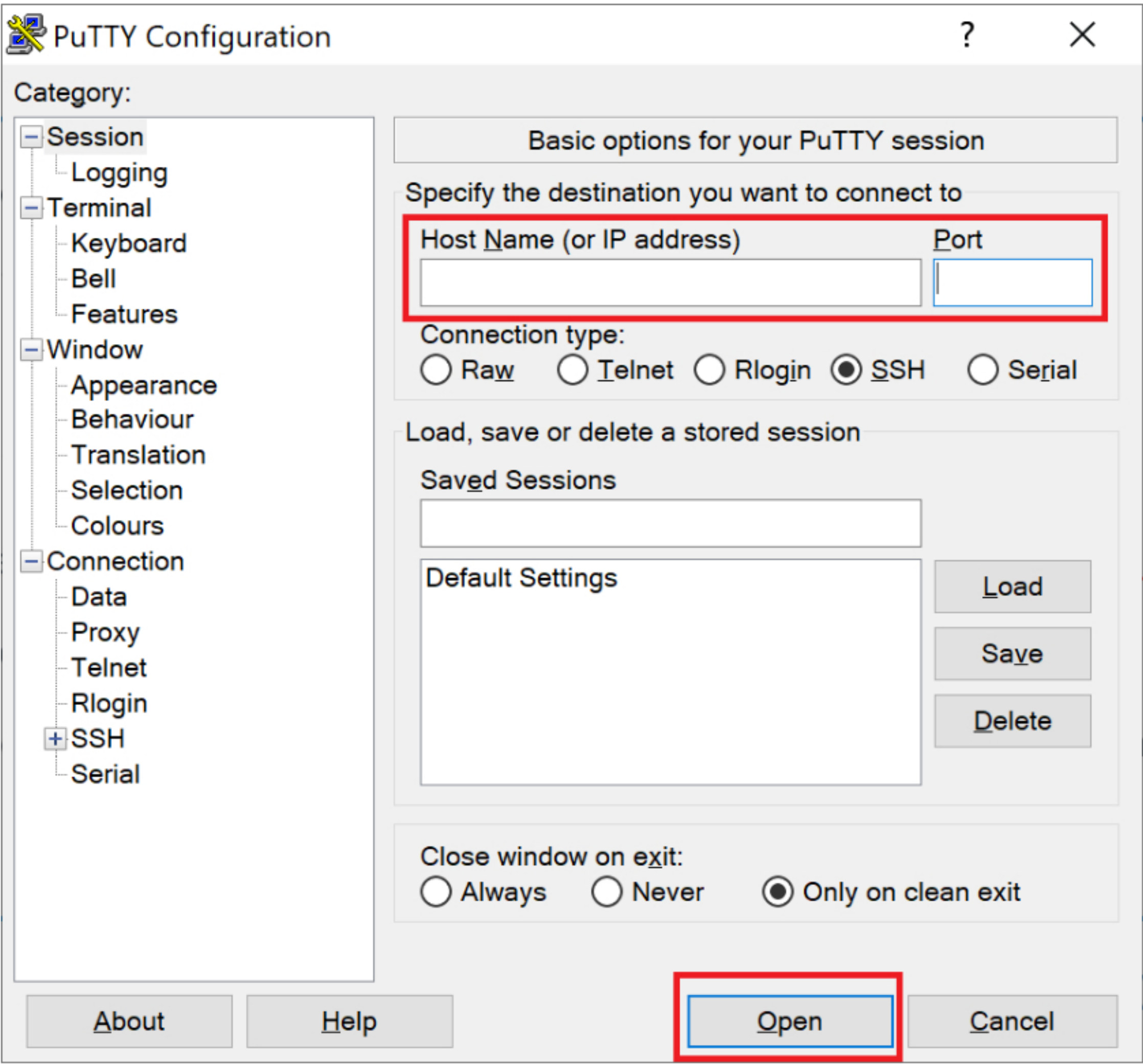
Once you are logged into your VM [using the username "deeplearning" (without the quotes) and the password you just created], you should:

- Activate the py37_tensorflow environment [you will need to do this each time you login]

```
conda activate py37_tensorflow
```

- Install the keras-tuner; install the kaggle API; and create your kaggle.json file [you will only need to do this once for this class]

```
pip install keras-tuner
pip install kaggle
mkdir ~/.kaggle
nano ~/.kaggle/kaggle.json
{"username":"UserNameGoesHere","key":"KeyGoesHere"}
# To save: Ctrl-X > "Y" > Enter
chmod 600 ~/.kaggle/kaggle.json
```

- Download the data and the example script; install the keras-tuner package; run the example script; upload your predictions to kaggle; and check the public leaderboard

```
kaggle competitions download ml530-2021-sp-mnist
wget http://cross-entropy.net/ml530/mnist-search.py.txt
python mnist-search.py.txt
kaggle competitions submit ml530-2021-sp-mnist -f predictions.csv -m "MLP submission"
kaggle competitions leaderboard ml530-2021-sp-mnist -s
```

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Submission

✓ **Submitted!**

Apr 13 at 1:26pm

Submission Details

Download HW01.txt

Grade: 6 (6 pts possible)

Graded Anonymously: no

Comments:
No Comments