LSTM - Exercise 4

Eden Dupont 204808596

Daniil Rolnik 334018009

To open the workspace

Use python 3.6.3 and do
$ pip install -r env.txt

env.txt is included within the zip file.

To run the GUI version, in the command line type
$ python ex4_gui.py

To run the exercise without the GUI type:
$ python ex4.py --epochs 15 --task alice

Use fewer epochs for faster results, however, they will not be as good.
For a faster run, you can use alice dataset

Sections outputs:

Results are from models used with the Alice dataset.

Model - number epochs = 15, reverse_lstm = False, hidden_layers = 1
Train - Loss = 7.186090862049776, Perplexity = 1320.929404380181
Validation - Loss = 7.1206027666727705, Perplexity = 1237.1959492429196
Test - Loss = 7.118311723073323, Perplexity = 1234.364723850948

Temperature = 0.1
“I love” probability = 0.00000000001814391174
“I love cupcakes” probability = 0.0000000000000002068

Temperature = 1
“I love” probability = 0.00000015637974734103
“I love cupcakes” probability = 0.00000000005689741113

Temperature = 10
“I love” probability = 0.00000017930607111542
“I love cupcakes” probability = 0.00000000007532666266

Model - number epochs = 15, reverse_lstm = True, hidden_layers = 1
Train - Loss = 7.1872118781594665, Perplexity = 1322.4110178233655
Validation - Loss = 7.124875386555989, Perplexity = 1242.4933260350422
Test - Loss = 7.123021284739177, Perplexity = 1240.1917512382117

Temperature = 0.1
“I love” probability = 0.00000000033912794906
“I love cupcakes” probability = 0.0000000000000016698

Temperature = 1
“I love” probability = 0.00000016152319685916
“I love cupcakes” probability = 0.00000000005892143064

Temperature = 10
“I love” probability = 0.00000017954708115745
“I love cupcakes” probability = 0.00000000007548821478

Model - number epochs = 15, reverse_lstm = False, hidden_layers = 2
Train - Loss = 6.916864451240091, Perplexity = 1009.1507870302996
Validation - Loss = 6.813436190287272, Perplexity = 909.9923476386781
Test - Loss = 6.808837254842122, Perplexity = 905.8169601043614

Temperature = 0.1
“I love” probability = 0.00000000000365800007
“I love cupcakes” probability = 0.0000000000000000006

Temperature = 1
“I love” probability = 0.0000014843378203522
“I love cupcakes” probability = 0.0000000004761096035

Temperature = 10
“I love” probability = 0.00000017851404895955
“I love cupcakes” probability = 0.00000000007426708573

Model - number epochs = 15, reverse_lstm = True, hidden_layers = 2
Train - Loss = 6.917610673343434, Perplexity = 1009.9041186945997
Validation - Loss = 6.814423243204753, Perplexity = 910.8910016768835
Test - Loss = 6.809364636739095, Perplexity = 906.2947975614284

Temperature = 0.1
“I love” probability = 0.00000000005117420159
“I love cupcakes” probability = 0.0000000000000000240

Temperature = 1
“I love” probability = 0.00000015625720566260
“I love cupcakes” probability = 0.00000000005176814928

Temperature = 10
“I love” probability = 0.00000017912857994351
“I love cupcakes” probability = 0.00000000007469767737

Full output may be found in **ex4_output.txt file.**

UI Section - Section 7

With the following UI, you are able to choose the hyperparameters for the model you will generate sentences from.
Including -

- reverse/normal training
- Number of epochs
- Number of layers

After pressing the create model button, you will be prompted to wait until the model is ready, after which you will be able to generate words using the size and temperature parameters

You will also be able to see the probability of the input sentence given the temperature in this model.

Loss and perplexity for the different datasets are shown below.