Addendum – ECE648 Final Project Report

II - Description of Designs and Computer Experiments:

B - Model 3 (K-Mer Prediction with More Complexity):

In order to increase the accuracy of this model, another training run was performed. Firstly, it was trained on the training K-Mer dataset with 15000 epochs, yielding an accuracy of 74%. Proceeding that, the model was trained on another 10000 epochs, for a total of 25000, which yielded an accuracy of 82%. This was accompanied with a lower learning rate, 0.001, which likely allowed a slower gradient descent process that was not 'bouncing around' too quickly or erratically, instead giving a smooth and consistent drop in the loss function over time. This was a great improvement and is included in the appended .ipybnb file.

learning rate = 0.001

Increased from before for more efficiency and speed of training.

epochs = 15000 and 25000

Decreased from before for more efficiency and speed of training.

III - Results:

Model 3:

```
Epoch 250 loss: 1.3490
Epoch 500 loss: 1.3412
Epoch 750 loss: 1.3389
Epoch 1000 loss: 1.3318
Epoch 1250 loss: 1.3205
Epoch 1500 loss: 1.3313
Epoch 1750 loss: 1.3141
Epoch 2000 loss: 1.3013
Epoch 2250 loss: 1.2951
Epoch 2500 loss: 1.2864
Epoch 2750 loss: 1.2927
Epoch 3000 loss: 1.2759
Epoch 3250 loss: 1.2658
Epoch 3500 loss: 1.2501
Epoch 3750 loss: 1.2309
Epoch 4000 loss: 1.2218
Epoch 4250 loss: 1.2060
Epoch 4500 loss: 1.1722
Epoch 4750 loss: 1.1636
Epoch 5000 loss: 1.1450
Epoch 5250 loss: 1.1328
Epoch 5500 loss: 1.1044
Epoch 5750 loss: 1.0757
Epoch 6000 loss: 1.0591
Epoch 6250 loss: 1.0635
Epoch 6500 loss: 1.0296
Epoch 6750 loss: 1.0268
Epoch 7000 loss: 1.0059
Epoch 7250 loss: 0.9950
Epoch 7500 loss: 0.9951
Epoch 7750 loss: 0.9798
Epoch 8000 loss: 0.9821
Epoch 8250 loss: 0.9722
Epoch 8500 loss: 0.9488
Epoch 8750 loss: 0.9312
Epoch 9000 loss: 0.9291
Epoch 9250 loss: 0.9235
Epoch 9500 loss: 0.9089
Epoch 9750 loss: 0.9000
Epoch 10000 loss: 0.9013
Epoch 10250 loss: 0.8901
Epoch 10500 loss: 0.9003
Epoch 10750 loss: 0.8826
Epoch 11000 loss: 0.8763
Epoch 11250 loss: 0.8771
Epoch 11500 loss: 0.8571
Epoch 11750 loss: 0.8558
Epoch 12000 loss: 0.8443
Epoch 12250 loss: 0.8357
Epoch 12500 loss: 0.8309
Epoch 12750 loss: 0.8267
Epoch 13000 loss: 0.8324
Epoch 13250 loss: 0.8264
Epoch 13500 loss: 0.8216
Epoch 13750 loss: 0.8253
Epoch 14000 loss: 0.7987
Epoch 14250 loss: 0.8108
Epoch 14500 loss: 0.7963
Epoch 14750 loss: 0.7938
```

```
Accuracy on test dataset: 74.2435%
```

```
Epoch 15000 loss: 0.7902
Epoch 15250 loss: 0.7839
Epoch 15500 loss: 0.7773
Epoch 15750 loss: 0.7796
Epoch 16000 loss: 0.7645
Epoch 16250 loss: 0.7684
Epoch 16500 loss: 0.7696
Epoch 16750 loss: 0.7740
Epoch 17000 loss: 0.7584
Epoch 17250 loss: 0.7417
Epoch 17500 loss: 0.7568
Epoch 17750 loss: 0.7504
Epoch 18000 loss: 0.7342
Epoch 18250 loss: 0.7485
Epoch 18500 loss: 0.7361
Epoch 18750 loss: 0.7323
Epoch 19000 loss: 0.7228
Epoch 19250 loss: 0.7251
Epoch 19500 loss: 0.7116
Epoch 19750 loss: 0.7204
Epoch 20000 loss: 0.7114
Epoch 20250 loss: 0.7165
Epoch 20500 loss: 0.7123
Epoch 20750 loss: 0.6938
Epoch 21000 loss: 0.6951
Epoch 21250 loss: 0.7086
Epoch 21500 loss: 0.6890
Epoch 21750 loss: 0.6985
Epoch 22000 loss: 0.6858
Epoch 22250 loss: 0.6792
Epoch 22500 loss: 0.6914
Epoch 22750 loss: 0.6855
Epoch 23000 loss: 0.6942
Epoch 23250 loss: 0.6844
Epoch 23500 loss: 0.6749
Epoch 23750 loss: 0.6649
Epoch 24000 loss: 0.6686
Epoch 24250 loss: 0.6730
Epoch 24500 loss: 0.6572
Epoch 24750 loss: 0.6607
```

```
Accuracy on test dataset: 81.4603%
```