ECE 544NA Fall 2016 Assignment 5

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TensorFlow

1. Methods

(1) Note: In this section, we followed some online tutorials for the implemention problems, such as:

a. $https://www.tensorflow.org/versions/r0.11/tutorials/recurrent/index.html$

b. $https://tensorhub.com/aymericdamien/tensorflow-rnn$

c. $https://github.com/tflearn/tflearn/blob/master/examples/images/rnn\_pixels.py$

d. $https://github.com/tensorflow/tensorflow/blob/master/tensorflow/g3doc/api_docs/python/functions_and_classes/shard0/tf.nn.rnn.md$

(2) Limited by the computation resources, we didn't train too many iterations, especially for the model with 784 steps. The detailed parameter settings are listed in Table 1.

Table 1: Parameter settings

Model	Basic RNN (t=784)	LSTM (t=784)	Basic RNN (t=28)	LSTM (t=28)
steps size	784	784	28	28
input size	1	1	28	28
learning rate	0.0005	0.0001	0.0001	0.0001
iterations	2000	1000	5000	5000
batch size	100	100	100	100

2. Results

(1) The convergence curves for mini-batch training-corpus accuracy of 4 different models are shown in Figure 1.

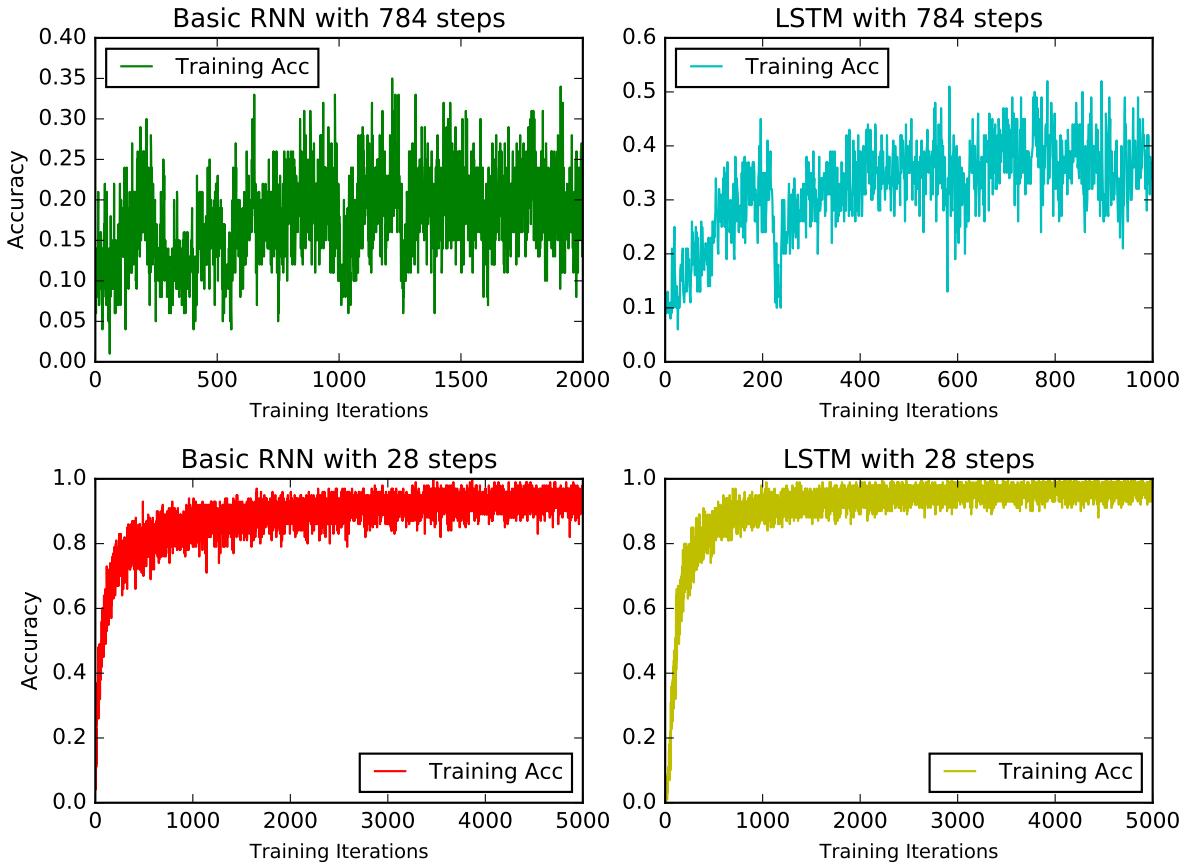

Figure 1: Convergence Curve

(2) The final training and testing accuracy are shown in Table 2

Table 2: Training and testing accuracies

Model	Training Set	Testing Set
Basic RNN (t=784)	20.40%	20.95%
LSTM (t=784)	40.82%	40.76%
Basic RNN (t=28)	93.61%	94.20%
LSTM (t=28)	96.68%	96.51%