UC Irvine, Division of Continuing Education

Deep Learning Using TensorFlow

Spring 2019

Homework#8

Date Given: May 27, 2019 Due Date: June 2, 2019

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THIS IS THE LAST HOMEWORK ASSIGNMENT. THIS COURSE ENDS ON JUNE 2, 2019

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Problem#1

In Lesson#8.2 Python/Keras/TensorFlow code is given which builds an RNN with 2 layers of LSTM. The input and output in the example shown in the lesson are as follows.

- Input: A series of 5 numbers: Example: 5,6,7,8,9
- Output: The next number in the series: Example: 10

Modify the given code to build an RNN which can accept an input of 8 serial numbers (instead of 5 as shown in the example of L#8.2) and predict the next number in the series.
For example:

- Input: A series of 8 numbers: Example: 5,6,7,8,9,10,11,12
- Output: The next number in the series: Example: 13

Generate more than 100 series. Split the data into training/testing randomly. Build the RNN using the training data set. Test the accuracy of your RNN by predicting the output of the input data in the 'testing' dataset. By scaling the dataset between 0-1, accuracy of the prediction will increase.

Problem#2

Analyze the Python source code 'AP Reinforcement.py'. This source code is used in Lesson #8.3 (Reinforcement Learning).

This python code starts with 8 (0-7) states. Remove the reward of 100 at state#7. Instead, add one more node (node#8) in the graph. Make the reward at node#8 to be 100. Rest of the characteristics of this problem will be same as the characteristics of the example shown in Lesson#8.3.

Using this new information train the model till the values of the Q-table converge. Next test this model and find the optimum policy (minimum distance from the start to node#8).