SC-403 Assignment 2

Submission deadline: 15th April 2019

Problem 1 [4 Mark]: Create a feed forward deep neural network for DC motor steady state modeling.
Data Description
Dataset: DC_motor.csv
Input: pulse
Output: RPM
Perform the following step:

1. Load the DC-Motor dataset
2. Split data into training and testing set into 70% and 30%
3. Configure a feedforward network with hidden layers and neuron
4. Compile the network using:
   (a) Mean squared error or binary cross entropy
   (b) Give validation split = 0.33
   (c) Specify batch size
5. Fit the model on training data
6. Plot the iteration versus loss for training data
7. Test the model for unseen data
8. Scatter plot for experimental and predicted operating points
9. Find the MSE for both training and testing set

Problem 2 [6 Mark]: Create a Multi-input-multi-output time series LSTM model for the Hybrid two tank system.
Data Description
Dataset: H2T_dynamicdata.csv
Input: Flow1, Flow2
Output: Level1, Level2
with the aim to predict the level of water in Hybrid 2-tank system for given input, Perform the following steps:

1. Load and pre-process (Normalize) the H2T dataset
2. Split data into training and testing set into 70% and 30%
3. Configure a LSTM network with hidden layers and neuron
4. Compile the network using:

   (a) Mean squared error
   (b) Give validation split = 0.33
   (c) Specify batch size
5. Fit the model on training data
6. Plot the iteration versus loss for training data
7. Test the model for unseen data
8. Find the MSE for both training and testing set in its actual unit (i.e. denormalize data)
9. Plot for experimental and predicted value of testing set
   (a) Flow1 vs level1
   (b) Flow2 vs level2

Instruction for submission:

1. Use **python code and Jupyter notebook editor** only
2. Submit a zipped file rollno_assignment2.zip consist of:
   (a) Problem1_FF.ipynb
   (b) Problem2_LSTM.ipynb
3. Documentation is not necessary.