COM 762: Deep Learning and Its Application

Assignment 2 for MSc
Date set: 1st March 2021
Submission date due: 4th May 2021
Feedback date due: 24th May 2021

This assignment carries 50% of the coursework marks for the module. The complete submission should be uploaded to the Assignment-2 folder in Blackboard by noon on the due date.

The assignment provides an opportunity for students to develop a Long Short Term Memory (LSTM) network for time series analysis using Python. LSTM networks is a type of Recurrent neural networks. The big advantage of LSTM models is to persistently accumulate propagation state over the input sequence, that is the output of the model from one timestep is provided as an input in the subsequent timestep of the model. This feature allows the model to make a prediction based on both the input for the current timestep and prior knowledge derived in the previous timestep, resulting in more stable prediction results.

The objective of this assignment is to develop and evaluate an LSTM model for multi-step time series forecasting on selected data sources. The specific tasks include:

(a) define a many-to-many type sequence prediction problem, such as power consumption forecast or solar energy forecast for next 3 days, etc.
(b) Design and develop an LSTM neural network with multiple input/output time steps
(c) This neural network should be composed of at least three hidden layers with two different activation functions
(d) Conduct performance analysis of the LSTM model via training and testing on appropriate data sources

The submission package includes

1. A report should consist of 5-7 pages in the IEEE format, covering the description of tasks (a)-(d); and screenshots for tasks (d). Note that screenshots must be captured in the PyCharm environment and submitted report must be a MS WORD file.
2. The source code and the explanation of how to run the program.