**Lab Assignment #5 – Apply LSTM algorithm to make future predictions using time series data**

Due Date: By the dropbox deadline.

Purpose: The purpose of this Lab assignment is to:

* Build LSTM models to make future predictions using time series data
* Use TensorFlow for implementing LSTM models and evaluate their accuracy

References: Read reference books and the lecture slides. This material provides the necessary information that you need to complete the exercises.

* Your submission **MUST** include the **dataset files (if any)** that you may have used. Instead of using a dataset file, **if you need call some function to fetch a dataset**, then that should be fine too.
* Your submission **must** be a **zip** file **if compressed**. Any other compression **is not accepted**.
* You MUST run the program of an exercise in the relevant .ipynb file and **MUST retain** **the output that gets generated** (Note that the textual output of a program in an .ipynb file stays in that .ipynb file if you do not delete the output).
* You **MUST** create a **demo video** of less than 3 minutes of your solution. **Do not** **show yourself** in the demo video. Upload your video in your personal youtube account or google-drive account and share its link with the instructor through the **Comments** **box** of submission pageas mentioned next (Do not share the video publicly).
* During submission at the dropbox, you should see a **Comments** **box** present near the bottom of the submission page. **Write the link of your video** in this **Comments** **box**.
* Next, upload your solution and submit.

**Exercise 1: LSTM**

In this exercise you will implement an LSTM model to make future predictions using time series data. Use TensorFlow to build an LSTM model for predicting stock prices for a company listed in the NASDAQ listings. For this assignment, you should first download the historic data of a company’s stock price in form of a .csv file. Then, use the data displayed in the column named **Close**. This column contains the closing price (i.e. the last price) of the day of a stock.

Evaluate the model test loss. Display the graph of real data and predicted data.

(**10 marks**)

**Note:** To download the historic data of a company’s stock price in form of a .csv file you may do as follows:

* Go to Yahoo Finance.
* Enter the company’s ticker symbol into the search field and select it from the drop-down list.
* Click **Historical Data**.
* Select a Time Period, data to Show, and Frequency.
* Click Apply.
* Click **Download**.

For example, to get the historic data of the company named Amazon, you should enter the ticker symbol AMZN.

**Evaluation:**

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| --- | --- |
| **Design and Functionality:**  Correct design and implementation of requirements  Code explanation if asked | 90% |
| **Documentation of code using comments:**  At least a single-line comment for each functionality | 10% |
| **Total** | 100% |

You must name your Jupyter notebook file(s) according to the following rule:

**YourFullname\_COMP377Labnumber\_Exercisenumber**.ipynb

Example: **JohnSmith\_COMP377Lab1\_Ex1**.ipynb

**Submission rules:**

Submit your solution as a **zip file** that is named according to the following rule:

**YourFullname\_COMP377Labnumber.zip**

Example: **JohnSmith\_COMP377Lab1.zip**

Use 7-zip to compress files (https://www.7-zip.org/download.html).