

Introduction to Machine Learning in Engineering Science

National Cheng Kung University

Department of Engineering Science

Instructor: Chi-Hua Yu

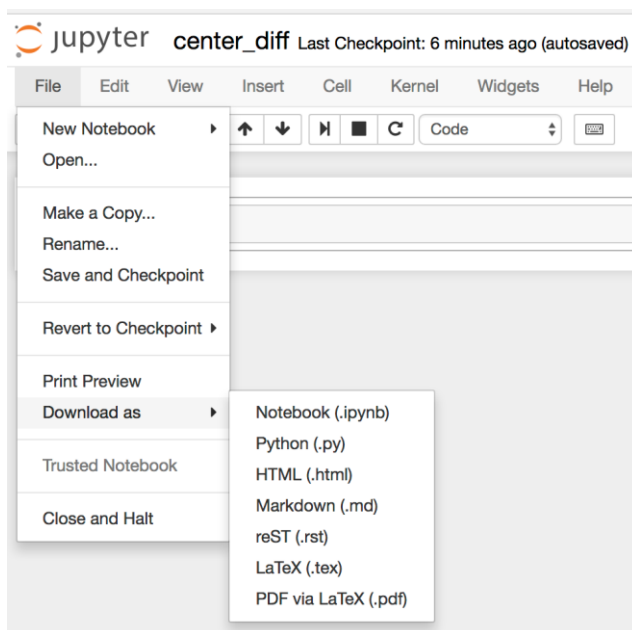
Lab 7

Programming, Due 11:55 am, Saturday, December 11th, 2021

Submit by 08:00pm on 12/08 will receive a 20% bonus. Late submission before post of solution: score*0.8 (the solution will usually be posted within a week); no late submission after the post of solution

Lab Submission Procedure (請仔細閱讀)

1. You should submit your Jupyter notebook and Python script (*.py, in Jupyter, click File, Download as, Python (*.py)).



2. Name a folder using your student id and lab number (e.g., n96081494_lab1), put all the python scripts into the folder and zip the folder (e.g., n96081494_lab 1.zip).
3. Submit your lab directly through the course website.

Total 100%

1. (100%) **Please download the zip file lab7.zip from Moodle.** Name your Jupyter notebook lstm_stock and Python script lstm_stock.py. Please create a lstm model to predict stock price. The dataset stock.zip can be downloaded from Moodle. The dataset contains dates and prices, the following is the data presented in tables and graphs.

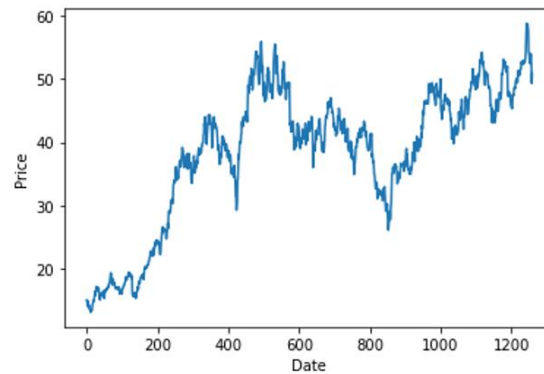
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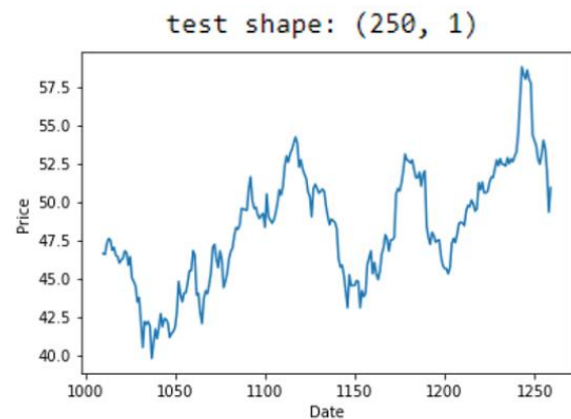
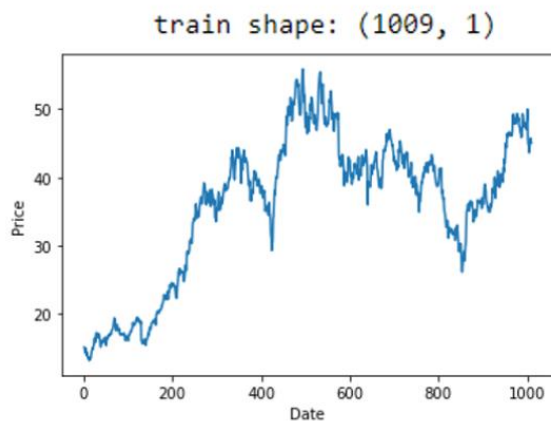
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	date	open
0	2013/2/8	15.07
1	2013/2/11	14.89
2	2013/2/12	14.45
3	2013/2/13	14.30
4	2013/2/14	14.94
...
1254	2018/2/1	54.00
1255	2018/2/2	53.49
1256	2018/2/5	51.99
1257	2018/2/6	49.32
1258	2018/2/7	50.91



Please divide the data into training set and testing set. The first 1009 data are used for model training, and the last 250 data are the test set. The figure below shows data shape and graphs.



The data pre-processing is to take the data of previous dates to predict the data of the next date. The figure below is an example. The figure uses the 3 data as inputs to predict the next data. (Here we use 3 pieces of data as an example, you can decide by yourself how many data you want to use as inputs.)

Features	{	date	open	date	open
		0	2013/2/8		1245	2018/1/19
		1	2013/2/11		1246	2018/1/22
Label	→	2	2013/2/12	1247	2018/1/23
		3	2013/2/13		1248	2018/1/24
		4	2013/2/14			

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X_train shape: (1006, 3, 1)

	date	open
0	2013/2/8	15.07
1	2013/2/11	14.89
2	2013/2/12	14.45
3	2013/2/13	14.30
4	2013/2/14	14.94
...
1004	2017/2/3	44.31
1005	2017/2/6	44.80
1006	2017/2/7	45.75
1007	2017/2/8	45.26
1008	2017/2/9	45.07

1006

X_test shape: (250, 3, 1)

	date	open
1006	2017/2/7	45.75
1007	2017/2/8	45.26
1008	2017/2/9	45.07
1009	2017/2/10	46.62
1010	2017/2/13	46.56
...
1254	2018/2/1	54.00
1255	2018/2/2	53.49
1256	2018/2/5	51.99
1257	2018/2/6	49.32
1258	2018/2/7	50.91

250

Please show the model and plot training history and the results of testing dataset (the last 250 data) predictions.

Model: "sequential_3"

Layer (type)	Output Shape	Param #
lstm_3 (LSTM)	(None, 3)	60
dense_3 (Dense)	(None, 1)	4

Total params: 64
Trainable params: 64
Non-trainable params: 0

