Operation Manual

In order to run this stock prediction model, the following instructions must be completed:

Requirements

Make sure the following are installed on your machine:

1. Python 3.8
2. Jupyter Notebook
3. Pip install the following libraries:
   a. Pandas
   b. Numpy
   c. Matplotlib
   d. Seaborn
   e. Tensorflow
   f. Sklearn
   g. Yfinance
   h. Datetime
   i. Ta
   j. Deepcopy
4. Using GPU is a must in order to prevent long runtimes. if you don't own a GPU, the project can run on 'Google Colab' or 'Kaggle' environments for free.

Model Configurations

The model has been build in a generic way, therefore many parameters can be configured in order to optimize the model to your needs.

1. **Section** - Get the data from Yahoo

   Parameters:

   a. ticker_list – stock tickers for prediction
   b. start_date , end_date – date range for data pooling

```
[5]:
# Stocks List
ticker_list = ['spy','goog','ba','amd','dji','aapl','nvda','wmt']
start_date = '1990-01-01'
end_date = '2021-05-27'
period = '1d'
```

2. **Section** – Feature Engineering

   Parameters:

   c. Boolean variables for a variety of technical financial indicators.
      Set desired features as True.

```
[10]:
# Indicators selection
rsi_bool = False
roc_bool = False
tsi_bool = False
adi_bool = False
fi_bool = False
atr_bool = False
macd_bool = False
vi_bool = False
cr_bool = False
ma_bool = False
ma_dis_bool = False
open_dis_bool = False
high_dis_bool = False
low_dis_bool = False
open_close_ratio_bool = False
```

d. days – amount of days to predict ahead

```
[14]:
# Amount of days to predict ahead
days = 240
```

e. past_days_array – list of days in the past, to select as extra features

```
[16]:
# Amount of days to check change in the past
past_days_array = [120,60,30,15,10,5,3]
```

3. **Section** - Split Train Test

Parameters:

f. days_batch – amount of days back to include in each batch for model

```
[19]:
days_batch=550
```

4. **Section** - Define model & Learn

Parameters:

g. epochs – amount of epochs to train (for each stock)
h. batch_size – training batch size, default = 32

```
# Set epochs & Batch_size
epochs = 15
batch_size = 32
```

## Run

After configurating all the parameters to your needs, just click "Run all" to run all notebook cells.
The last section of the notebook will present and conclude all of the model results.

Output examples

accuracy

```
ba
                precision    recall   f1-score    support

            0       0.86      0.92       0.89        981
            1       0.81      0.70       0.75        495

     accuracy                            0.85       1476
    macro avg       0.84      0.81       0.82       1476
 weighted avg       0.84      0.85       0.84       1476
```
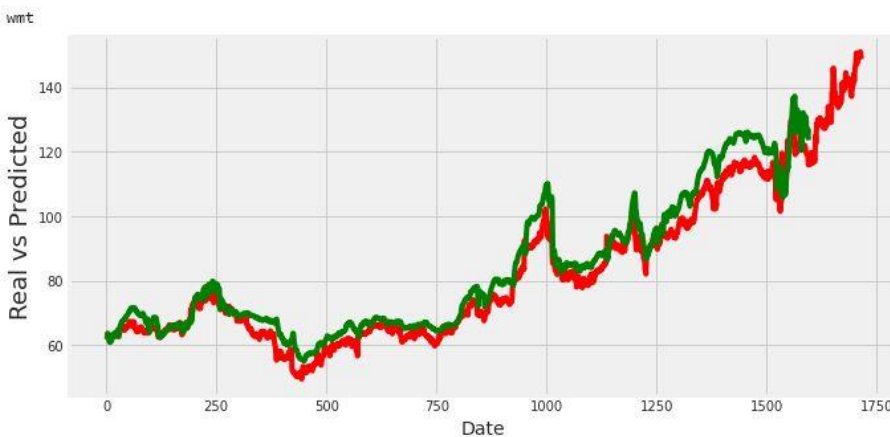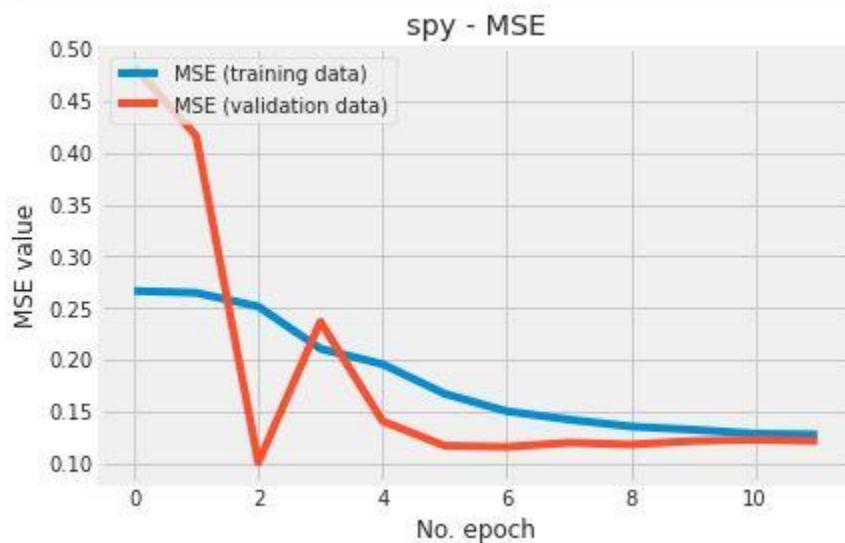
Prediction graph
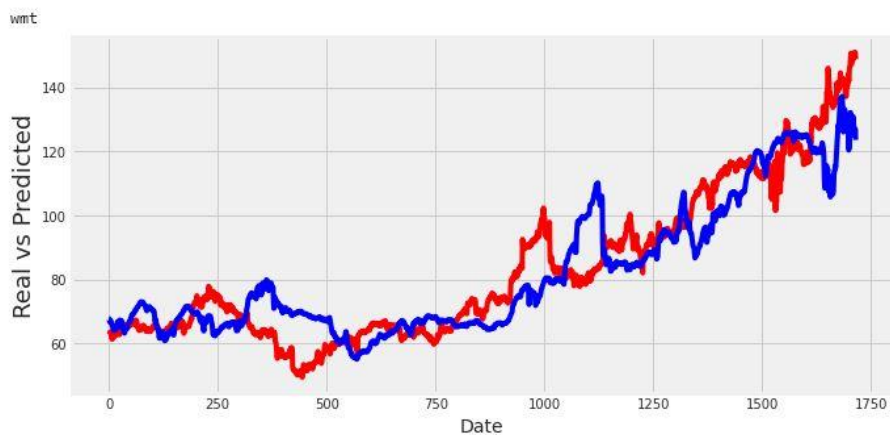
Prediction graph with offset

MSE & Loss

spy - MSE

Past average interest

```
The stock      spy    has    30      annaul values
The stock      goog   has    18      annaul values
The stock      ba     has    33      annaul values
The stock      amd    has    33      annaul values
The stock      dji    has    33      annaul values
The stock      aapl   has    33      annaul values
The stock      nvda   has    24      annaul values
The stock      wmt    has    33      annaul values

[['spy', 1.105151919435537],
 ['goog', 1.2839663025599306],
 ['ba', 1.1438512948687474],
 ['amd', 1.4568252032034152],
 ['dji', 1.088404671273036],
 ['aapl', 1.3119806261214004],
 ['nvda', 1.5040072084791691],
 ['wmt', 1.1308994310030283]]
```

Future predicted interest

```
Stock:    spy    Interest:       109.69186
Stock:    goog   Interest:       109.57129
Stock:    ba     Interest:       113.39281
Stock:    amd    Interest:       100.69851
Stock:    dji    Interest:       113.10261
Stock:    aapl   Interest:       109.55076
Stock:    nvda   Interest:       99.95611
Stock:    wmt    Interest:       110.010345
```

Conclusions Summary

Research Conclusion