Moving_Average_High_Low

September 29, 2021

1 Moving Averages of the High and Low

```
[1]: import numpy as np
     import pandas as pd
     import matplotlib.pyplot as plt

     import warnings
     warnings.filterwarnings("ignore")

     # fix_yahoo_finance is used to fetch data
     import fix_yahoo_finance as yf
     yf.pdr_override()
```

```
[2]: # input
     symbol = 'AAPL'
     start = '2018-01-01'
     end = '2018-12-31'

     # Read data
     df = yf.download(symbol,start,end)

     # View Columns
     df.head()
```

```
[*********************100%***********************]  1 of 1 downloaded
```

```
[2]:                   Open        High         Low       Close    Adj Close  \
     Date
     2018-01-02  170.160004  172.300003  169.259995  172.259995  168.339050
     2018-01-03  172.529999  174.550003  171.960007  172.229996  168.309738
     2018-01-04  172.539993  173.470001  172.080002  173.029999  169.091522
     2018-01-05  173.440002  175.369995  173.050003  175.000000  171.016678
     2018-01-08  174.350006  175.610001  173.929993  174.350006  170.381485

                   Volume
     Date
     2018-01-02  25555900
```

```
2018-01-03   29517900
2018-01-04   22434600
2018-01-05   23660000
2018-01-08   20567800
```

[3]:
```python
n = 14 # number of periods
df['MA_High'] = df['High'].rolling(n).mean()
df['MA_Low'] = df['Low'].rolling(n).mean()
```

[4]:
```python
df.head(20)
```

[4]:
```
                 Open        High         Low       Close    Adj Close  \
Date
2018-01-02  170.160004  172.300003  169.259995  172.259995  168.339050
2018-01-03  172.529999  174.550003  171.960007  172.229996  168.309738
2018-01-04  172.539993  173.470001  172.080002  173.029999  169.091522
2018-01-05  173.440002  175.369995  173.050003  175.000000  171.016678
2018-01-08  174.350006  175.610001  173.929993  174.350006  170.381485
2018-01-09  174.550003  175.059998  173.410004  174.330002  170.361954
2018-01-10  173.160004  174.300003  173.000000  174.289993  170.322845
2018-01-11  174.589996  175.490005  174.490005  175.279999  171.290329
2018-01-12  176.179993  177.360001  175.649994  177.089996  173.059113
2018-01-16  177.899994  179.389999  176.139999  176.190002  172.179611
2018-01-17  176.149994  179.250000  175.070007  179.100006  175.023361
2018-01-18  179.369995  180.100006  178.250000  179.259995  175.179718
2018-01-19  178.610001  179.580002  177.410004  178.460007  174.397949
2018-01-22  177.300003  177.779999  176.600006  177.000000  172.971176
2018-01-23  177.300003  179.440002  176.820007  177.039993  173.010254
2018-01-24  177.250000  177.300003  173.199997  174.220001  170.254440
2018-01-25  174.509995  174.949997  170.529999  171.110001  167.215210
2018-01-26  172.000000  172.000000  170.059998  171.509995  167.606140
2018-01-29  170.160004  170.160004  167.070007  167.960007  164.136932
2018-01-30  165.529999  167.369995  164.699997  166.970001  163.169464

              Volume    MA_High     MA_Low
Date
2018-01-02  25555900        NaN        NaN
2018-01-03  29517900        NaN        NaN
2018-01-04  22434600        NaN        NaN
2018-01-05  23660000        NaN        NaN
2018-01-08  20567800        NaN        NaN
2018-01-09  21584000        NaN        NaN
2018-01-10  23959900        NaN        NaN
2018-01-11  18667700        NaN        NaN
2018-01-12  25226000        NaN        NaN
2018-01-16  29565900        NaN        NaN
2018-01-17  34386800        NaN        NaN
```
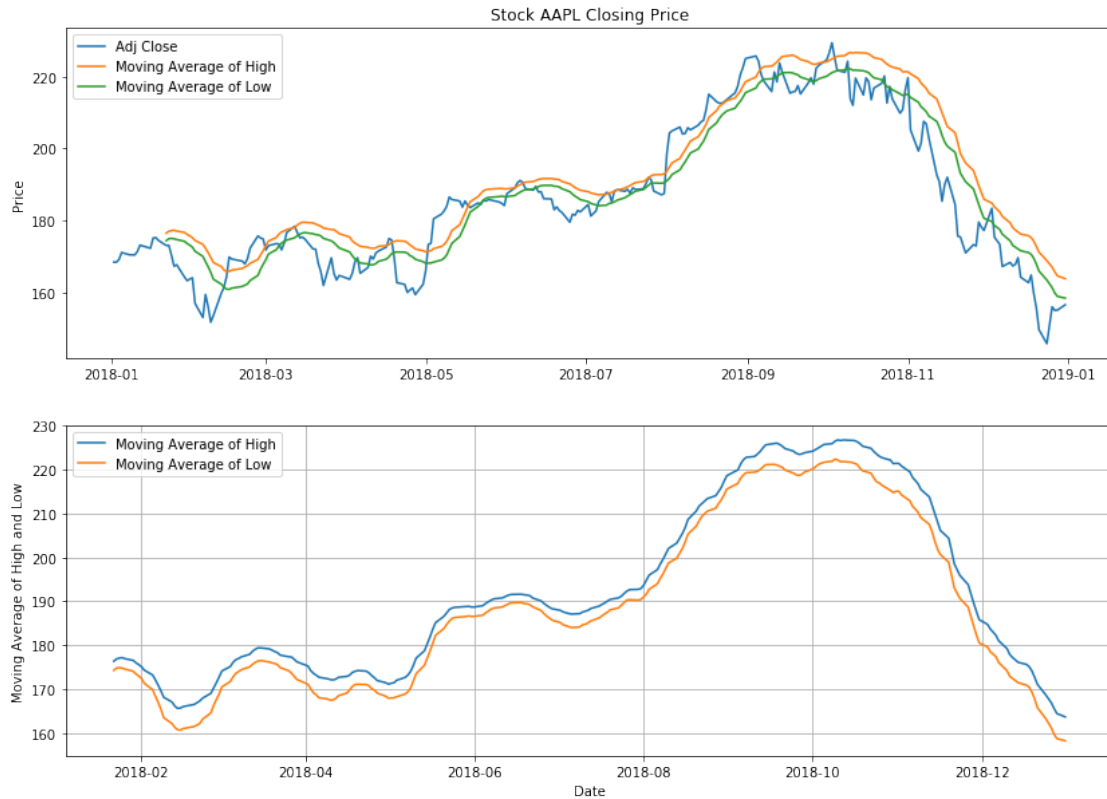
```
2018-01-18   31193400         NaN          NaN
2018-01-19   32425100         NaN          NaN
2018-01-22   27108600   176.400715   174.307144
2018-01-23   32689100   176.910715   174.847145
2018-01-24   51105100   177.107144   174.935716
2018-01-25   41529000   177.212858   174.825001
2018-01-26   39143000   176.972144   174.611430
2018-01-29   50640400   176.582858   174.121431
2018-01-30   46048200   176.033573   173.499287
```

[5]:
```python
fig = plt.figure(figsize=(14,10))
ax1 = plt.subplot(2, 1, 1)
ax1.plot(df['Adj Close'])
ax1.plot(df['MA_High'], label='Moving Average of High')
ax1.plot(df['MA_Low'], label='Moving Average of Low')
ax1.set_title('Stock '+ symbol +' Closing Price')
ax1.set_ylabel('Price')
ax1.legend(loc='best')

ax2 = plt.subplot(2, 1, 2)
ax2.plot(df['MA_High'], label='Moving Average of High')
ax2.plot(df['MA_Low'], label='Moving Average of Low')
ax2.grid()
ax2.legend(loc='best')
ax2.set_ylabel('Moving Average of High and Low')
ax2.set_xlabel('Date')
```

[5]: Text(0.5,0,'Date')

1.1 Candlestick with Moving Averages of the High and Low

```python
from matplotlib import dates as mdates
import datetime as dt

dfc = df.copy()
dfc['VolumePositive'] = dfc['Open'] < dfc['Adj Close']
#dfc = dfc.dropna()
dfc = dfc.reset_index()
dfc['Date'] = mdates.date2num(dfc['Date'].astype(dt.date))
dfc.head()
```

```
[6]:        Date        Open        High         Low        Close   Adj Close  \
     0  736696.0  170.160004  172.300003  169.259995  172.259995  168.339050
     1  736697.0  172.529999  174.550003  171.960007  172.229996  168.309738
     2  736698.0  172.539993  173.470001  172.080002  173.029999  169.091522
     3  736699.0  173.440002  175.369995  173.050003  175.000000  171.016678
     4  736702.0  174.350006  175.610001  173.929993  174.350006  170.381485

          Volume  MA_High  MA_Low  VolumePositive
     0  25555900      NaN     NaN           False
```

4

```
1  29517900      NaN     NaN            False
2  22434600      NaN     NaN            False
3  23660000      NaN     NaN            False
4  20567800      NaN     NaN            False
```

[7]:
```python
from mpl_finance import candlestick_ohlc

fig = plt.figure(figsize=(14,10))
ax1 = plt.subplot(2, 1, 1)
candlestick_ohlc(ax1,dfc.values, width=0.5, colorup='g', colordown='r', alpha=1.
 →0)
ax1.plot(df['MA_High'], label='Moving Average of High')
ax1.plot(df['MA_Low'], label='Moving Average of Low')
ax1.xaxis_date()
ax1.xaxis.set_major_formatter(mdates.DateFormatter('%d-%m-%Y'))
ax1.grid(True, which='both')
ax1.minorticks_on()
ax1v = ax1.twinx()
colors = dfc.VolumePositive.map({True: 'g', False: 'r'})
ax1v.bar(dfc.Date, dfc['Volume'], color=colors, alpha=0.4)
ax1v.axes.yaxis.set_ticklabels([])
ax1v.set_ylim(0, 3*df.Volume.max())
ax1.set_title('Stock '+ symbol +' Closing Price')
ax1.set_ylabel('Price')
ax1.legend(loc='best')

ax2 = plt.subplot(2, 1, 2)
ax2.plot(df['MA_High'], label='Moving Average of High')
ax2.plot(df['MA_Low'], label='Moving Average of Low')
ax2.grid()
ax2.legend(loc='best')
ax2.set_ylabel('Moving Average of High and Low')
ax2.set_xlabel('Date')
```

[7]: Text(0.5,0,'Date')