Smoothed_Moving_Average

September 29, 2021

1 Smoothed Moving Average

https://www.danielstrading.com/education/technical-analysis-learning-center/smoothed-moving-average

https://mahifx.com/mfxtrade/indicators/smoothed-moving-average-smma

[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 = '2019-01-01'

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

# View Columns
df.head()
```

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

[2]:

Date	Open	High	Low	Close	Adj Close
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]:
```
n = 7
df['SMMA'] = pd.Series(df['Adj Close'].ewm(alpha=1 / float(n)).mean())
```

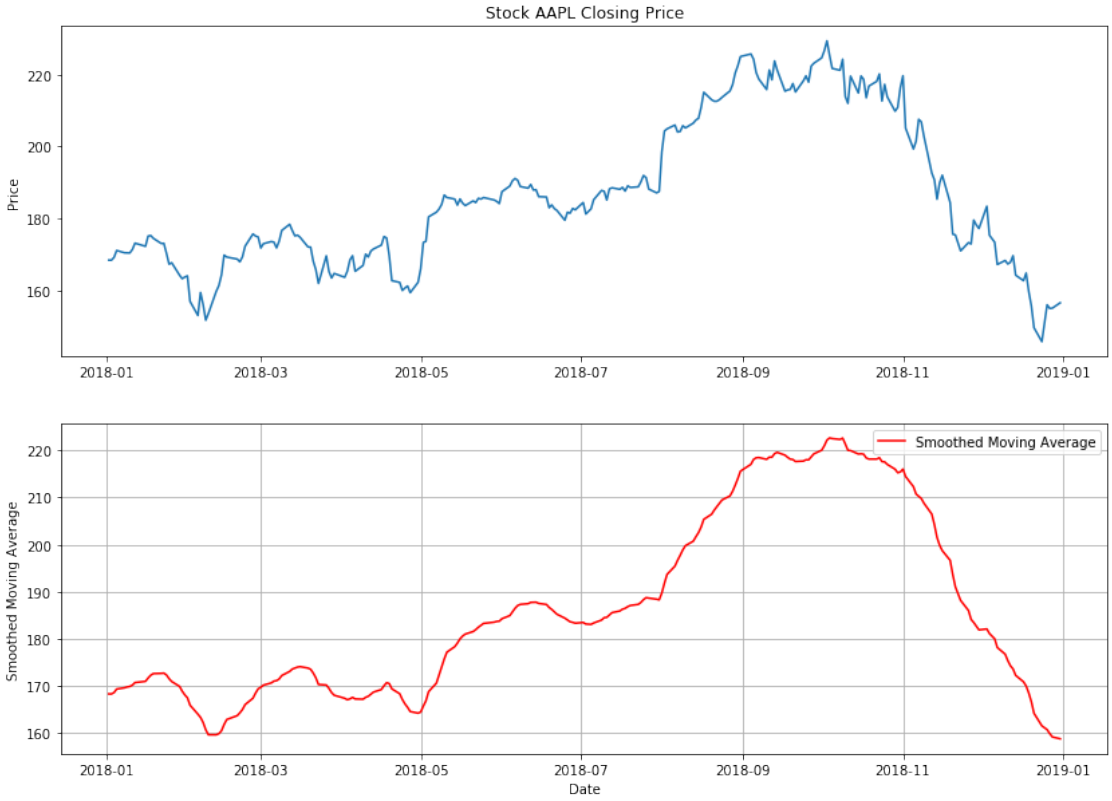
[4]:
```
df.head(20)
```

[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        SMMA
Date
2018-01-02  25555900  168.339050
2018-01-03  29517900  168.323267
2018-01-04  22434600  168.619680
2018-01-05  23660000  169.363726
2018-01-08  20567800  169.634309
2018-01-09  21584000  169.806573
2018-01-10  23959900  169.918306
2018-01-11  18667700  170.194896
```

```
2018-01-12  25418100  170.740268
2018-01-16  29565900  171.001891
2018-01-17  34386800  171.705480
2018-01-18  31193400  172.294421
2018-01-19  32425100  172.641744
2018-01-22  27108600  172.694954
2018-01-23  32689100  172.744948
2018-01-24  51105100  172.356157
2018-01-25  41529000  171.564105
2018-01-26  39143000  170.961072
2018-01-29  50640400  169.931137
2018-01-30  46048200  168.918797
```

[5]:
```
fig = plt.figure(figsize=(14,10))
ax1 = plt.subplot(2, 1, 1)
ax1.plot(df['Adj Close'])
ax1.set_title('Stock '+ symbol +' Closing Price')
ax1.set_ylabel('Price')

ax2 = plt.subplot(2, 1, 2)
ax2.plot(df['SMMA'], label='Smoothed Moving Average', color='red')
#ax2.axhline(y=0, color='blue', linestyle='--')
ax2.grid()
ax2.set_ylabel('Smoothed Moving Average')
ax2.set_xlabel('Date')
ax2.legend(loc='best')
```

[5]:
```
<matplotlib.legend.Legend at 0x1ecf6408940>
```



1.1 Candlestick with Smoothed Moving Average

[6]:
```
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'] = pd.to_datetime(dfc['Date'])
dfc['Date'] = dfc['Date'].apply(mdates.date2num)
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	SMMA	VolumePositive

```
0  25555900  168.339050          False
1  29517900  168.323267          False
2  22434600  168.619680          False
3  23660000  169.363726          False
4  20567800  169.634309          False
```

[7]:
```
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.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')

ax2 = plt.subplot(2, 1, 2)
ax2.plot(df['SMMA'], label='Smoothed Moving Average', color='red')
#ax2.axhline(y=0, color='blue', linestyle='--')
ax2.grid()
ax2.set_ylabel('Smoothed Moving Average')
ax2.set_xlabel('Date')
ax2.legend(loc='best')
```

[7]:
```
<matplotlib.legend.Legend at 0x1ecf7e37b38>
```


Stock AAPL Closing Price
Price
220
200
180
160
01-01-2018
01-03-2018
01-05-2018
01-07-2018
01-09-2018
01-11-2018
01-01-2019
Smoothed Moving Average
Smoothed Moving Average
220
210
200
190
180
170
160
2018-01
2018-03
2018-05
2018-07
2018-09
2018-11
2019-01
Date