Moving_Average_Envelopes

September 29, 2021

1 Moving Average Envelopes

https://stockcharts.com/school/doku.php?id=chart_school:technical_indicators:moving_average_envelopes

[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	Volume
2018-01-02	170.160004	172.300003	169.259995	172.259995	168.987320	
2018-01-03	172.529999	174.550003	171.960007	172.229996	168.957886	
2018-01-04	172.539993	173.470001	172.080002	173.029999	169.742706	
2018-01-05	173.440002	175.369995	173.050003	175.000000	171.675278	
2018-01-08	174.350006	175.610001	173.929993	174.350006	171.037628	

```
2018-01-02  25555900
2018-01-03  29517900
2018-01-04  22434600
2018-01-05  23660000
2018-01-08  20567800
```

[3]:
```
import talib as ta
```

[4]:
```
df['20SMA'] = ta.SMA(df['Adj Close'], timeperiod=20)
```

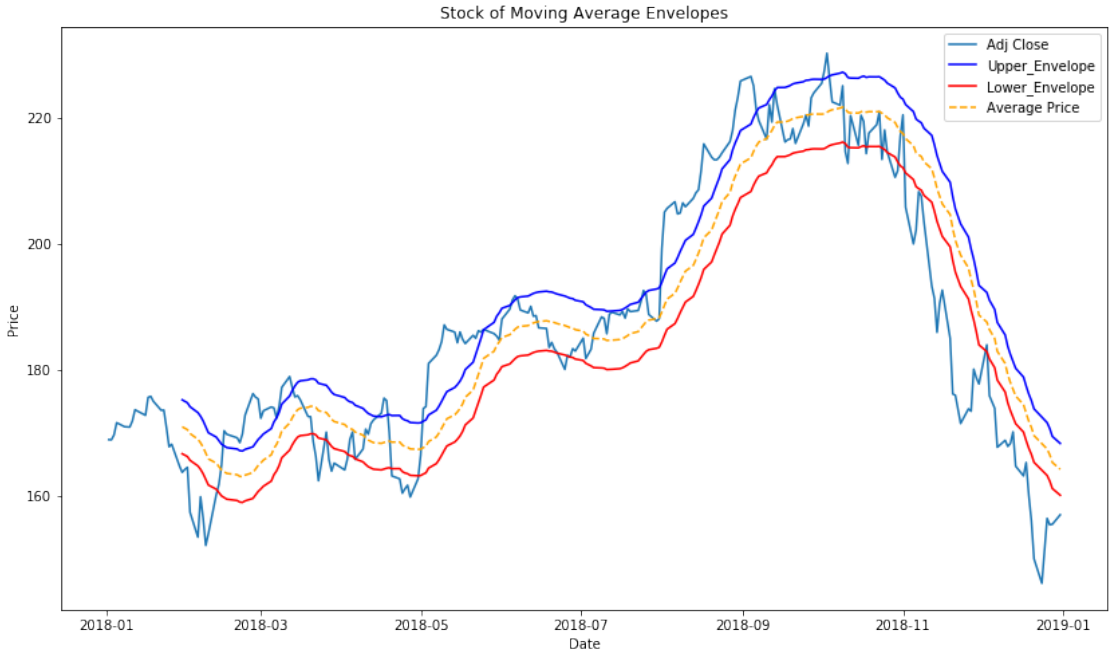
[5]:
```
df['Upper_Envelope'] = df['20SMA'] + (df['20SMA'] * 0.025)
df['Lower_Envelope'] = df['20SMA'] - (df['20SMA'] * 0.025)
```

[6]:
```
df.head()
```

[6]:
```
                 Open        High         Low       Close   Adj Close  \
Date
2018-01-02  170.160004  172.300003  169.259995  172.259995  168.987320
2018-01-03  172.529999  174.550003  171.960007  172.229996  168.957886
2018-01-04  172.539993  173.470001  172.080002  173.029999  169.742706
2018-01-05  173.440002  175.369995  173.050003  175.000000  171.675278
2018-01-08  174.350006  175.610001  173.929993  174.350006  171.037628

              Volume  20SMA  Upper_Envelope  Lower_Envelope
Date
2018-01-02  25555900    NaN             NaN             NaN
2018-01-03  29517900    NaN             NaN             NaN
2018-01-04  22434600    NaN             NaN             NaN
2018-01-05  23660000    NaN             NaN             NaN
2018-01-08  20567800    NaN             NaN             NaN
```

[7]:
```
# Line Chart
plt.figure(figsize=(14,8))
plt.plot(df['Adj Close'])
plt.plot(df['Upper_Envelope'], color='blue')
plt.plot(df['Lower_Envelope'], color='red')
plt.plot(df['Adj Close'].rolling(20).mean(), color='orange', label='Average␣
 ↪Price', linestyle='--')
plt.title('Stock of Moving Average Envelopes')
plt.ylabel('Price')
plt.xlabel('Date')
plt.legend(loc='best')
plt.show()
```



1.1 Candlestick with MAE

[8]:
```
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()
```

[8]:

	Date	Open	High	Low	Close	Adj Close	\
0	736696.0	170.160004	172.300003	169.259995	172.259995	168.987320	
1	736697.0	172.529999	174.550003	171.960007	172.229996	168.957886	
2	736698.0	172.539993	173.470001	172.080002	173.029999	169.742706	
3	736699.0	173.440002	175.369995	173.050003	175.000000	171.675278	
4	736702.0	174.350006	175.610001	173.929993	174.350006	171.037628	

	Volume	20SMA	Upper_Envelope	Lower_Envelope	VolumePositive
0	25555900	NaN	NaN	NaN	False
1	29517900	NaN	NaN	NaN	False
2	22434600	NaN	NaN	NaN	False
3	23660000	NaN	NaN	NaN	False
4	20567800	NaN	NaN	NaN	False

[9]:
```
from mpl_finance import candlestick_ohlc

fig = plt.figure(figsize=(18,8))
ax1 = plt.subplot(111)
candlestick_ohlc(ax1,dfc.values, width=0.5, colorup='g', colordown='r', alpha=1.
↪0)
ax1.plot(df['Upper_Envelope'], color='blue')
ax1.plot(df['Lower_Envelope'], color='red')
ax1.plot(df['Adj Close'].rolling(20).mean(), color='orange')
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.legend(loc='best')
ax1.set_ylabel('Price')
ax1.set_xlabel('Date')
```

[9]:
```
Text(0.5,0,'Date')
```