EMAV

September 29, 2021

1 Exponential Moving Average of Volume (EMAV)

https://www.investopedia.com/ask/answers/122314/what-exponential-moving-average-ema-formula-and-how-ema-calculated.asp

[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 = '2017-01-01'
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
2017-01-03	115.800003	116.330002	114.760002	116.150002	112.140007	
2017-01-04	115.849998	116.510002	115.750000	116.019997	112.014503	
2017-01-05	115.919998	116.860001	115.809998	116.610001	112.584129	
2017-01-06	116.779999	118.160004	116.470001	117.910004	113.839249	
2017-01-09	117.949997	119.430000	117.940002	118.989998	114.881950	

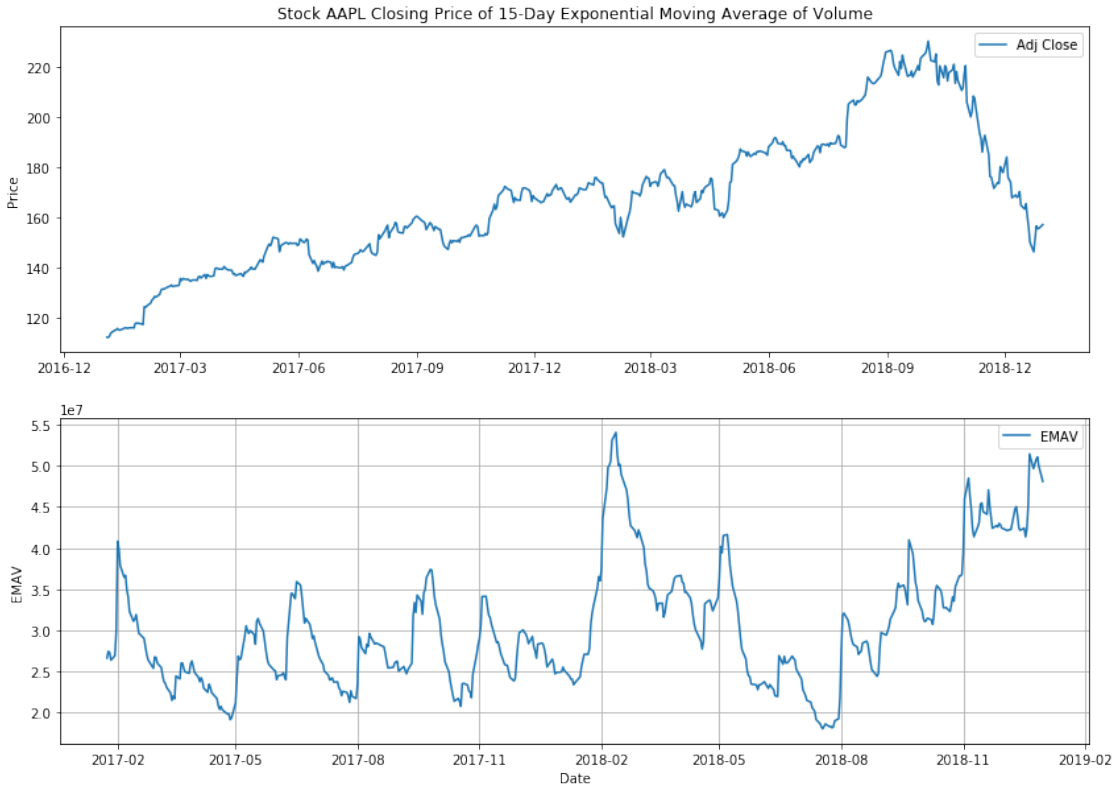
```
Date
2017-01-03  28781900
2017-01-04  21118100
2017-01-05  22193600
2017-01-06  31751900
2017-01-09  33561900
```

[3]:
```
n = 15
df['EMAV'] = df['Volume'].ewm(ignore_na=False,span=n,min_periods=n,adjust=True).
 ↪mean()
```

[4]:
```
fig = plt.figure(figsize=(14,10))
ax1 = plt.subplot(2, 1, 1)
ax1.plot(df['Adj Close'])
ax1.set_title('Stock '+ symbol +' Closing Price of ' + str(n) + '-Day␣
 ↪Exponential Moving Average of Volume')
ax1.set_ylabel('Price')
ax1.legend(loc='best')

ax2 = plt.subplot(2, 1, 2)
ax2.plot(df['EMAV'])
ax2.grid()
ax2.legend(loc='best')
ax2.set_ylabel('EMAV')
ax2.set_xlabel('Date')
```

[4]:
```
Text(0.5,0,'Date')
```



1.1 Candlestick with EMAV

[5]:
```
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()
```

[5]:

	Date	Open	High	Low	Close	Adj Close	Volume	EMAV	VolumePositive
0	736332.0	115.800003	116.330002	114.760002	116.150002	112.140007	28781900	NaN	False
1	736333.0	115.849998	116.510002	115.750000	116.019997	112.014503	21118100	NaN	False
2	736334.0	115.919998	116.860001	115.809998	116.610001	112.584129			
3	736335.0	116.779999	118.160004	116.470001	117.910004	113.839249			
4	736338.0	117.949997	119.430000	117.940002	118.989998	114.881950			

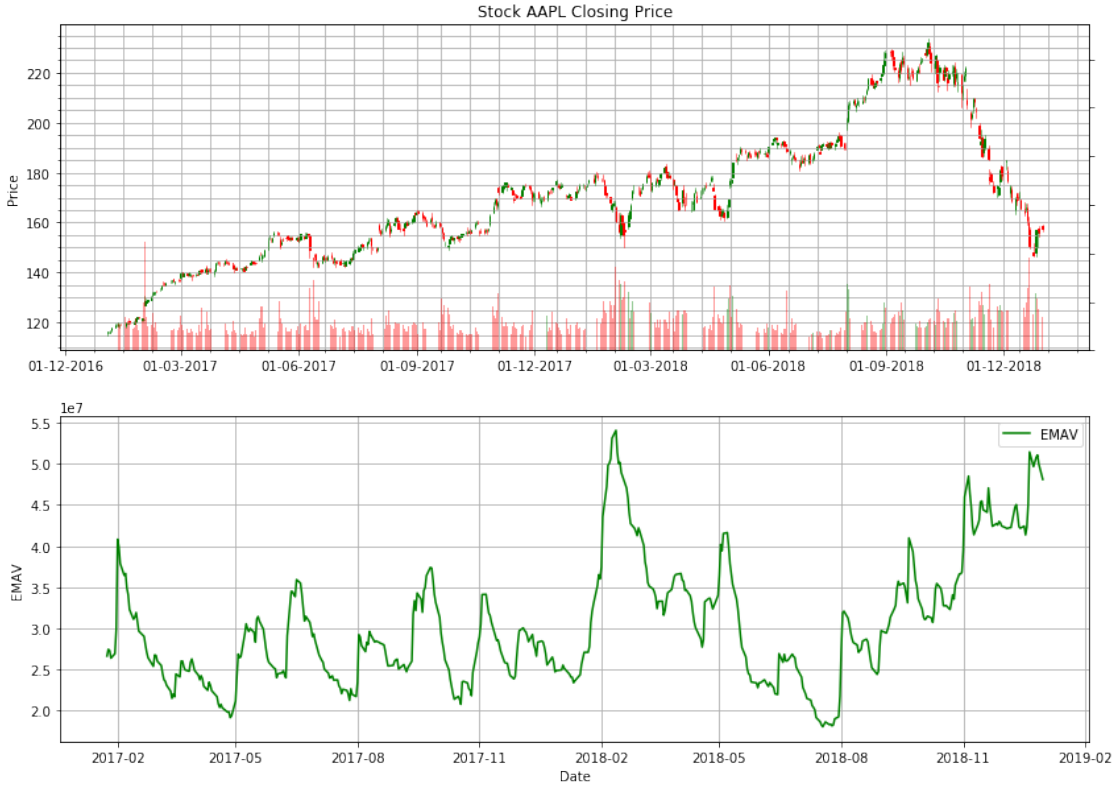
```
2  22193600   NaN          False
3  31751900   NaN          False
4  33561900   NaN          False
```

[6]:
```
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['EMAV'], label='EMAV', color='g')
ax2.grid()
ax2.legend(loc='best')
ax2.set_ylabel('EMAV')
ax2.set_xlabel('Date')
```

[6]:
```
Text(0.5,0,'Date')
```


Stock AAPL Closing Price
Price
220
200
180
160
140
120
01-12-2016
01-03-2017
01-06-2017
01-09-2017
01-12-2017
01-03-2018
01-06-2018
01-09-2018
01-12-2018
1e7
EMAV
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
2017-02
2017-05
2017-08
2017-11
2018-02
2018-05
2018-08
2018-11
2019-02
Date