Bollinger_Bands

September 29, 2021

1 Bollinger Bands

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

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

import warnings
warnings.filterwarnings("ignore")

import yfinance as yf
yf.pdr_override()
```

[2]:
```
# input
symbol = 'AAPL'
start = '2018-09-01'
end = '2019-01-01'

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

# View Columns
df.head()
```

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

[2]:

Date	Adj Close	Close	High	Low	Open	Volume
2018-09-04	223.666595	228.360001	229.179993	226.630005	228.410004	27390100
2018-09-05	222.207230	226.869995	229.669998	225.100006	228.990005	
2018-09-06	218.514709	223.100006	227.350006	221.300003	226.229996	
2018-09-07	216.751694	221.300003	225.369995	220.710007	221.850006	
2018-09-10	213.842728	218.330002	221.850006	216.470001	220.949997	

```
2018-09-05  33333000
2018-09-06  34290000
2018-09-07  37619800
2018-09-10  39516500
```

[3]:
```
n = 20
MA = pd.Series(df['Adj Close'].rolling(n).mean())
STD = pd.Series(df['Adj Close'].rolling(n).std())
bb1 = MA + 2*STD
df['Upper Bollinger Band'] = pd.Series(bb1)
bb2 = MA - 2*STD
df['Lower Bollinger Band'] = pd.Series(bb2)
```

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

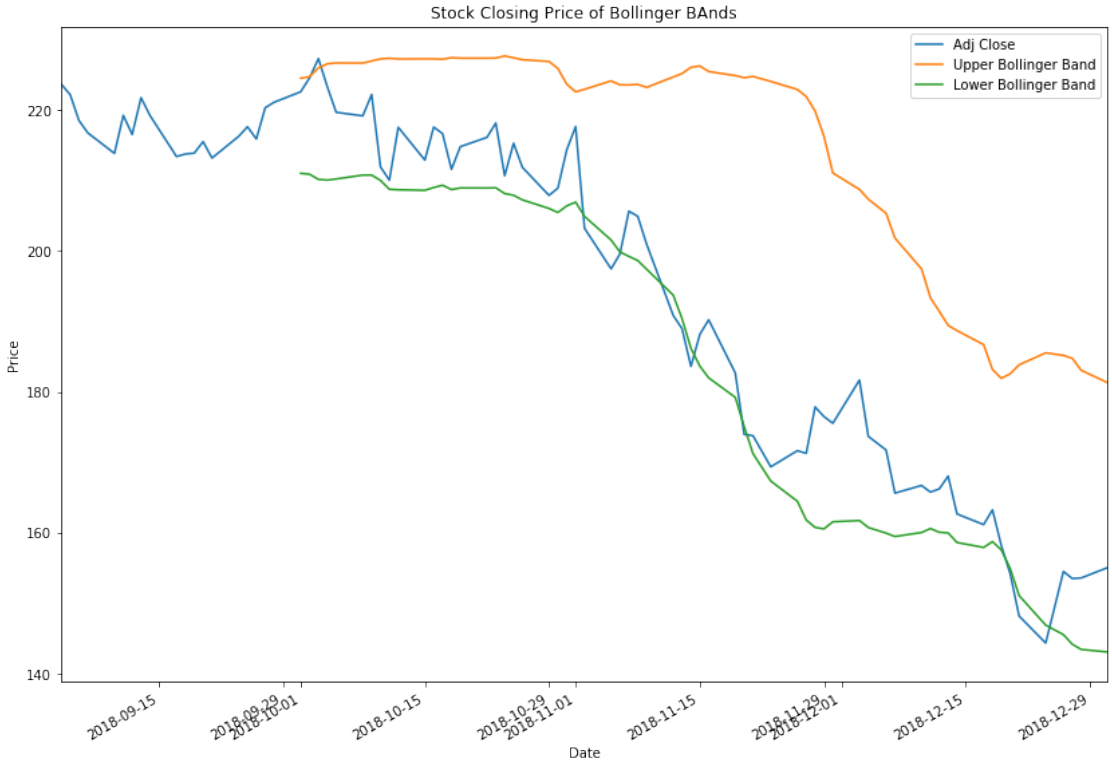
[4]:

Date	Adj Close	Close	High	Low	Open	Volume	Upper Bollinger Band	Lower Bollinger Band
2018-09-04	223.666595	228.360001	229.179993	226.630005	228.410004	27390100	NaN	NaN
2018-09-05	222.207230	226.869995	229.669998	225.100006	228.990005	33333000	NaN	NaN
2018-09-06	218.514709	223.100006	227.350006	221.300003	226.229996	34290000	NaN	NaN
2018-09-07	216.751694	221.300003	225.369995	220.710007	221.850006	37619800	NaN	NaN
2018-09-10	213.842728	218.330002	221.850006	216.470001	220.949997	39516500	NaN	NaN

[5]:
```
plt.figure()
df[['Adj Close', 'Upper Bollinger Band','Lower Bollinger Band']].
 ↪plot(figsize=(14,10))
plt.ylabel('Price')
plt.xlabel('Date')
plt.title('Stock Closing Price of Bollinger BAnds')
plt.legend(loc='best')
```

[5]:
```
<matplotlib.legend.Legend at 0x22e467e1898>
```

```
<Figure size 432x288 with 0 Axes>
```



1.1 Candlestick with Bollinger Bands

[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	Adj Close	Close	High	Low	Open
0	736941.0	223.666595	228.360001	229.179993	226.630005	228.410004
1	736942.0	222.207230	226.869995	229.669998	225.100006	228.990005
2	736943.0	218.514709	223.100006	227.350006	221.300003	226.229996
3	736944.0	216.751694	221.300003	225.369995	220.710007	221.850006
4	736947.0	213.842728	218.330002	221.850006	216.470001	220.949997

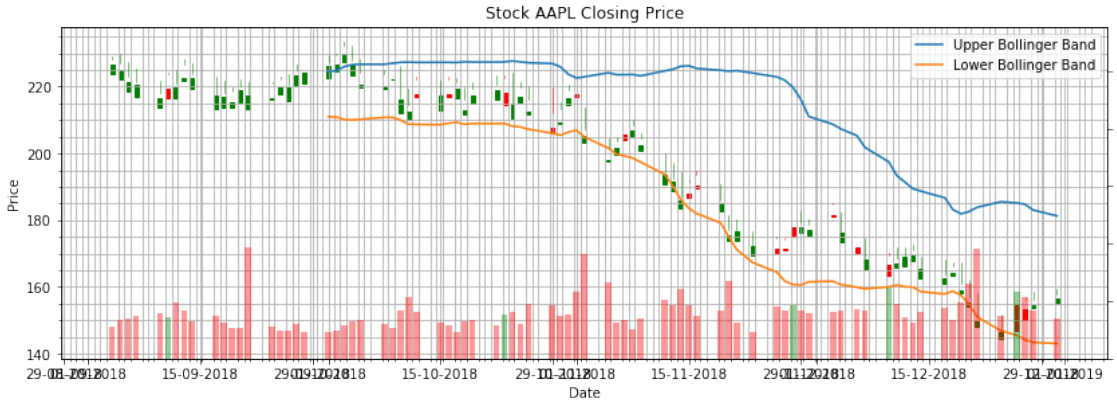
	Volume	Upper Bollinger Band	Lower Bollinger Band	VolumePositive
0	27390100	NaN	NaN	False

1	33333000	NaN	NaN	False
2	34290000	NaN	NaN	False
3	37619800	NaN	NaN	False
4	39516500	NaN	NaN	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.plot(df['Upper Bollinger Band'], label='Upper Bollinger Band')
ax1.plot(df['Lower Bollinger Band'], label='Lower Bollinger Band')
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')
```

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

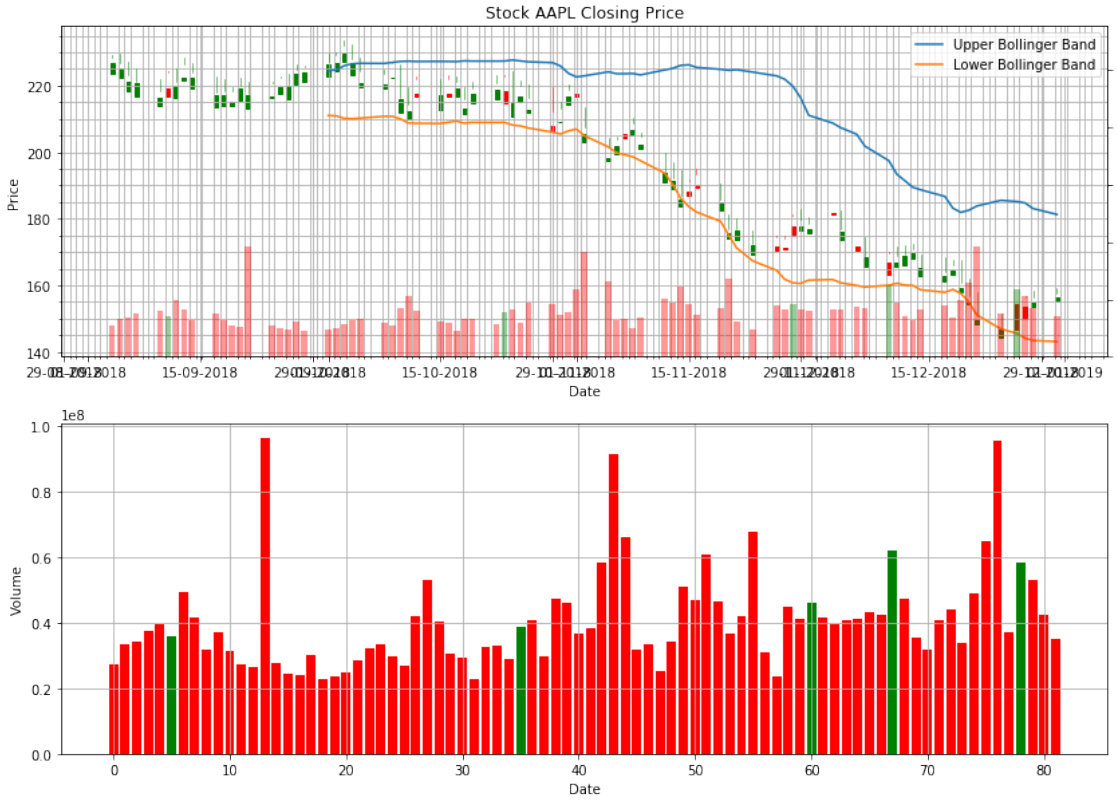


[8]:
```
fig = plt.figure(figsize=(14,10))
ax1 = plt.subplot(2, 1, 1)
```

```
candlestick_ohlc(ax1,dfc.values, width=0.5, colorup='g', colordown='r', alpha=1.
↪0)
ax1.plot(df['Upper Bollinger Band'], label='Upper Bollinger Band')
ax1.plot(df['Lower Bollinger Band'], label='Lower Bollinger Band')
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')

ax2 = plt.subplot(2, 1, 2)
ax2.bar(dfc.index, dfc['Volume'], color=dfc.VolumePositive.map({True: 'g',␣
↪False: 'r'}))
ax2.grid()
ax2.set_ylabel('Volume')
ax2.set_xlabel('Date')
```

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


Stock AAPL Closing Price
Upper Bollinger Band
Lower Bollinger Band
Price
Date
1e8
Volume
Date