BBWidth

September 29, 2021

1 Bollinger BandWidth

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

```python
[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()
```

```python
[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]:                 Open        High         Low       Close    Adj Close  \
     Date
     2017-01-03  115.800003  116.330002  114.760002  116.150002  111.709831
     2017-01-04  115.849998  116.510002  115.750000  116.019997  111.584778
     2017-01-05  115.919998  116.860001  115.809998  116.610001  112.152229
     2017-01-06  116.779999  118.160004  116.470001  117.910004  113.402542
     2017-01-09  117.949997  119.430000  117.940002  118.989998  114.441246

                     Volume
     Date
```

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

[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)
df['SMA'] = df['Adj Close'].rolling(n).mean()
```

[4]:
```
df['BBWidth'] = (df['Upper Bollinger Band'] - df['Lower Bollinger Band'])/
 ↪df['SMA'] * 100
```

[5]:
```
fig = plt.figure(figsize=(14,10))
ax1 = plt.subplot(2, 1, 1)
ax1.plot(df['Adj Close'])
ax1.plot(df['Upper Bollinger Band'])
ax1.plot(df['Lower Bollinger Band'])
ax1.plot(df['Adj Close'].rolling(20).mean(), label='Mean Average',␣
 ↪linestyle='--')
ax1.set_title('Stock '+ symbol +' Closing Price')
ax1.set_ylabel('Price')
ax1.legend(loc='best')

ax2 = plt.subplot(2, 1, 2)
ax2.plot(df['BBWidth'], label='BB Width', color='black')
ax2.plot(df['BBWidth'].rolling(20).mean(), label='200 Moving Average',␣
 ↪color='darkblue')
ax2.grid()
ax2.legend(loc='best')
ax2.set_ylabel('BB Width')
ax2.set_xlabel('Date')
```
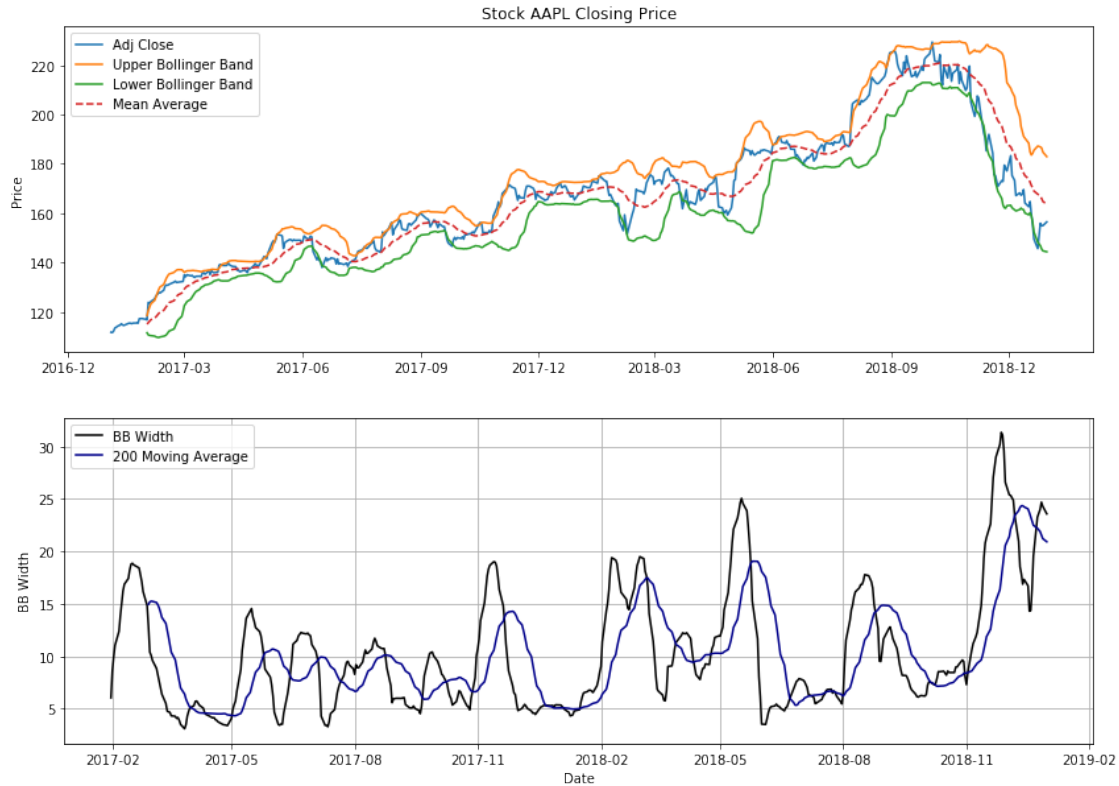
[5]: Text(0.5,0,'Date')

Stock AAPL Closing Price

1.1 Candlestick with BB Width

```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  736332.0  115.800003  116.330002  114.760002  116.150002  111.709831
    1  736333.0  115.849998  116.510002  115.750000  116.019997  111.584778
    2  736334.0  115.919998  116.860001  115.809998  116.610001  112.152229
    3  736335.0  116.779999  118.160004  116.470001  117.910004  113.402542
    4  736338.0  117.949997  119.430000  117.940002  118.989998  114.441246

        Volume  Upper Bollinger Band  Lower Bollinger Band  SMA  BBWidth  \
    0  28781900                   NaN                   NaN  NaN      NaN
    1  21118100                   NaN                   NaN  NaN      NaN
```

3

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

    VolumePositive
0          False
1          False
2          False
3          False
4          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['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.plot(df['BBWidth'], label='BB Width', color='black')
ax2.plot(df['BBWidth'].rolling(20).mean(), label='200 Moving Average',␣
 ↪color='darkblue')
ax2.grid()
ax2.legend(loc='best')
ax2.set_ylabel('BB Width')
ax2.set_xlabel('Date')
```

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

Stock AAPL Closing Price