ROC100

September 29, 2021

1 Rate of Change (ROC100)

https://www.tradingtechnologies.com/xtrader-help/x-study/technical-indicator-definitions/rate-of-change-roc100/

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

[2]:

```
# input
symbol = 'AAPL'
start = '2016-01-01'
end = '2019-01-01'

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

# View Columns
df.head()
```

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

[2]:

```
             Adj Close       Close        High         Low        Open  \
Date
2016-01-04  98.446655  105.349998  105.370003  102.000000  102.610001
2016-01-05  95.979675  102.709999  105.849998  102.410004  105.750000
2016-01-06  94.101387  100.699997  102.370003   99.870003  100.559998
2016-01-07  90.129868   96.449997  100.129997   96.430000   98.680000
2016-01-08  90.606438   96.959999   99.110001   96.760002   98.550003

              Volume
```

```
Date
2016-01-04   67649400
2016-01-05   55791000
2016-01-06   68457400
2016-01-07   81094400
2016-01-08   70798000
```

[3]:

```
n = 12
df['ROC100'] = (df['Adj Close']/df['Adj Close'].shift(n)) * 100
```

[4]:

```
df.head(20)
```

[4]:

```
            Adj Close       Close        High         Low        Open  \
Date
2016-01-04  98.446655  105.349998  105.370003  102.000000  102.610001
2016-01-05  95.979675  102.709999  105.849998  102.410004  105.750000
2016-01-06  94.101387  100.699997  102.370003   99.870003  100.559998
2016-01-07  90.129868   96.449997  100.129997   96.430000   98.680000
2016-01-08  90.606438   96.959999   99.110001   96.760002   98.550003
2016-01-11  92.073563   98.529999   99.059998   97.339996   98.970001
2016-01-12  93.409874   99.959999  100.690002   98.839996  100.550003
2016-01-13  91.008270   97.389999  101.190002   97.300003  100.320000
2016-01-14  92.998695   99.519997  100.480003   95.739998   97.959999
2016-01-15  90.765305   97.129997   97.709999   95.360001   96.199997
2016-01-19  90.326103   96.660004   98.650002   95.500000   98.410004
2016-01-20  90.447578   96.790001   98.190002   93.419998   95.099998
2016-01-21  89.989700   96.300003   97.879997   94.940002   97.059998
2016-01-22  94.774200  101.419998  101.459999   98.370003   98.629997
2016-01-25  92.923958   99.440002  101.529999   99.209999  101.519997
2016-01-26  93.437889   99.989998  100.879997   98.070000   99.930000
2016-01-27  87.298416   93.419998   96.629997   93.339996   96.040001
2016-01-28  87.924500   94.089996   94.519997   92.389999   93.790001
2016-01-29  90.961533   97.339996   97.339996   94.349998   94.790001
2016-02-01  90.111168   96.430000   96.709999   95.400002   96.470001

               Volume      ROC100
Date
2016-01-04   67649400         NaN
2016-01-05   55791000         NaN
2016-01-06   68457400         NaN
2016-01-07   81094400         NaN
2016-01-08   70798000         NaN
2016-01-11   49739400         NaN
2016-01-12   49154200         NaN
2016-01-13   62439600         NaN
2016-01-14   63170100         NaN
2016-01-15   79833900         NaN
```

```
2016-01-19   53087700         NaN
2016-01-20   72334400         NaN
2016-01-21   52161500   91.409607
2016-01-22   65800500   98.744031
2016-01-25   51794500   98.748765
2016-01-26   75077000  103.670283
2016-01-27  133369700   96.349022
2016-01-28   55678800   95.493752
2016-01-29   64416500   97.378927
2016-02-01   40943500   99.014263
```

```
[5]: df.tail()
```

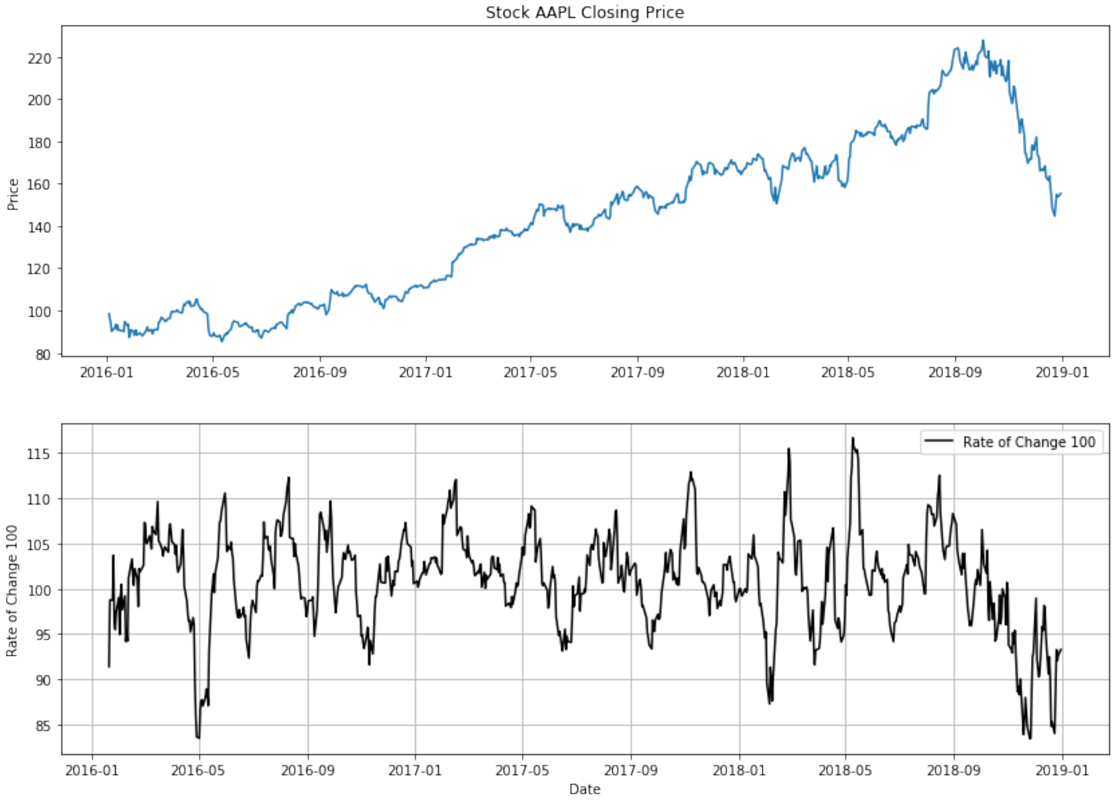
```
[5]:              Adj Close       Close        High         Low        Open  \
     Date
     2018-12-24  144.656540  146.830002  151.550003  146.589996  148.149994
     2018-12-26  154.843475  157.169998  157.229996  146.720001  148.300003
     2018-12-27  153.838562  156.149994  156.770004  150.070007  155.839996
     2018-12-28  153.917389  156.229996  158.520004  154.550003  157.500000
     2018-12-31  155.405045  157.740005  159.360001  156.479996  158.529999

                   Volume     ROC100
     Date
     2018-12-24  37169200  84.037324
     2018-12-26  58582500  93.281491
     2018-12-27  53117100  92.069569
     2018-12-28  42291400  92.646615
     2018-12-31  35003500  93.282087
```

```
[6]: 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['ROC100'], label='Rate of Change 100', color='black')
     #ax2.axhline(y=0, color='blue', linestyle='--')
     #ax2.axhline(y=10, color='red')
     #ax2.axhline(y=-10, color='green')
     ax2.grid()
     ax2.set_ylabel('Rate of Change 100')
     ax2.set_xlabel('Date')
     ax2.legend(loc='best')
```

```
[6]: <matplotlib.legend.Legend at 0x1f88ae9d630>
```



1.1 Candlestick with (ROC100)

[7]:

```
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()
```

[7]:

```
       Date  Adj Close       Close        High         Low        Open  \
0  735967.0  98.446655  105.349998  105.370003  102.000000  102.610001
1  735968.0  95.979675  102.709999  105.849998  102.410004  105.750000
2  735969.0  94.101387  100.699997  102.370003   99.870003  100.559998
3  735970.0  90.129868   96.449997  100.129997   96.430000   98.680000
4  735971.0  90.606438   96.959999   99.110001   96.760002   98.550003

     Volume  ROC100  VolumePositive
```

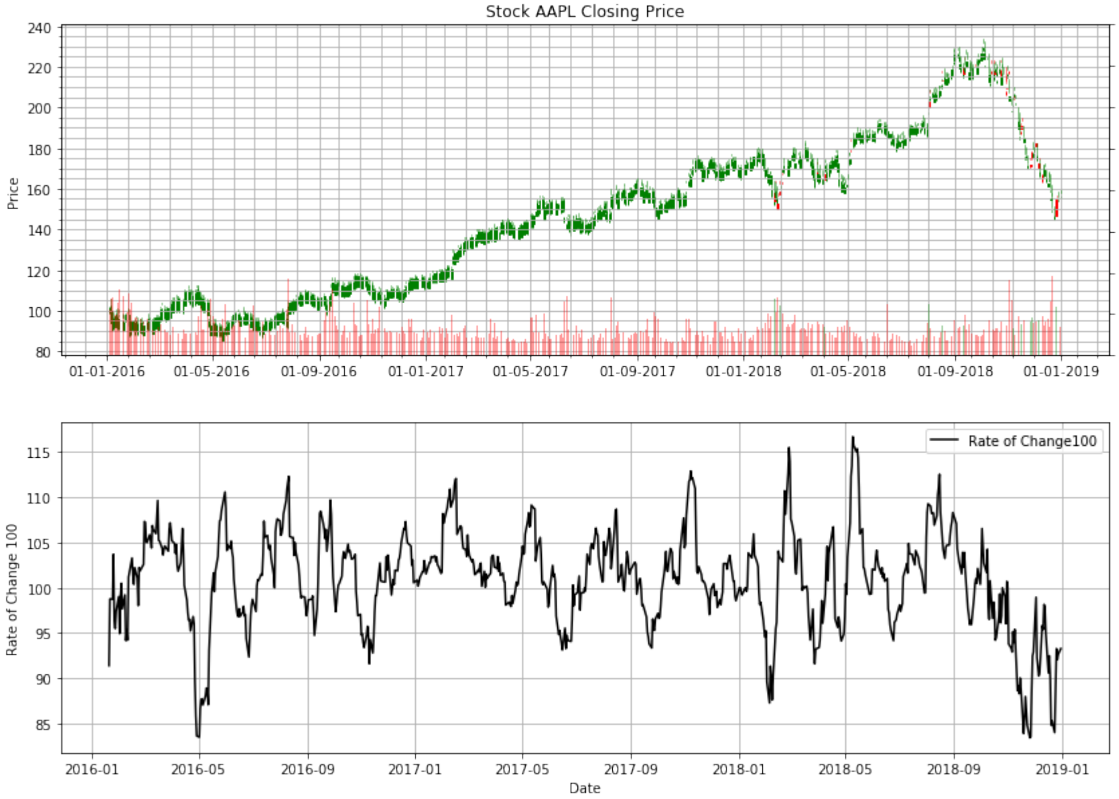
```
0  67649400     NaN           False
1  55791000     NaN           False
2  68457400     NaN           False
3  81094400     NaN           False
4  70798000     NaN           False
```

[8]:
```
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['ROC100'], label='Rate of Change100', color='black')
#ax2.axhline(y=0, color='blue', linestyle='--')
#ax2.axhline(y=10, color='red')
#ax2.axhline(y=-10, color='green')
ax2.grid()
ax2.set_ylabel('Rate of Change 100')
ax2.set_xlabel('Date')
ax2.legend(loc='best')
```

[8]:
```
<matplotlib.legend.Legend at 0x1f88cdebe80>
```


Stock AAPL Closing Price
Price
240
220
200
180
160
140
120
100
80
01-01-2016
01-05-2016
01-09-2016
01-01-2017
01-05-2017
01-09-2017
01-01-2018
01-05-2018
01-09-2018
01-01-2019
Rate of Change100
Rate of Change 100
115
110
105
100
95
90
85
2016-01
2016-05
2016-09
2017-01
2017-05
2017-09
2018-01
2018-05
2018-09
2019-01
Date